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sional dealers in capital assets are excluded.³³ Expenditures exclude outlay on durable assets as well as capital losses (including writedowns). Distributions to owners include only those made from current net income.³⁴ Here the difference between period income and expenditure equals the net change in the original depreciated cost value of assets minus the corresponding value of liabilities, i.e., the change in earned net worth (as distinguished from changes in net worth due to realized or unrealized capital gains and losses).

Thus the equivalence between net income minus distributions to owners and changes in net worth is preserved in both cases. But in the total-net-worth approach it is predicated on the valuation of balance sheet assets and liabilities at market value and a very wide concept of income and expenditures, while in the earned-net-worth approach it calls for valuation at depreciated original cost and a narrow concept of income and expenditures. Since in the process of consolidating unit balance sheets into a national balance sheet, net worth becomes equal to tangible assets (with adjustments only for the net foreign balance and certain minor intangibles), there is also equivalence under both methods between changes in net worth and in the value of tangible assets (adjusted as above). However, the equivalence is established on the basis of market values of assets in the total-net-worth approach and on that of original depreciated cost in the earned-net-worth approach.

How far the two approaches differ statistically can be shown for the United States thanks to Simon Kuznets. In the sixty years between 1879 and 1939, accumulated net capital formation at current prices amounted to about \$200 billion.³⁵ As the value of national wealth at original depreciated cost can hardly

³³ That the distinction is not always neatly made in practice is indicated by the statement about *realized* capital gains and losses in Sanders, Hatfield, and Moore (p. 88): "so called 'capital gains' and 'capital losses' are conspicuous examples of occurrences affecting the asset values of a business enterprise for which accounting practice discloses no generally followed or standard method of accounting".

³⁴ Practice again varies, but good accounting demands at least separation of distributions from current income, earned surplus, or capital (*ibid.*, p. 52).

³⁵ *National Product since 1869* (NBER, 1946), Table II 15, p. 118.

have exceeded \$35 billion in 1879,⁸⁶ the original depreciated cost value for 1939 should have been about \$235 billion. Estimates, however, put the 1939 figure, at market prices, at nearly \$400 billion.⁸⁷ A large part of the difference between original depreciated cost and market values is accounted for by the value of the most important nonreproducible asset: land.⁸⁸ For reproducible wealth the market value is only a little—something like \$30 billion, or less than 15 percent—above the depreciated cost, i.e., accumulated current value of net capital formation. By 1946, however, with a depreciated cost of national wealth of about \$250 billion but a market value of over \$700 billion, the difference had risen to the tremendous total of over \$450 billion, of which less than half is accounted for by the value of land.⁸⁹ Reproducible wealth in 1948 was worth nearly twice its original depreciated cost, owing to the war and postwar inflation.

5 Comparability of National Wealth Estimates

National wealth estimates derived from a system of business accounting are comparable only to the extent that the methods are the same, i.e., the method of valuation and the scope of national wealth are identical or practically so. This condition is met by the estimates for the United States for 1929, 1939, and 1946, presented in the rest of this volume.

This formal comparability, however, means merely that the figures refer to the same thing—the consolidated net worth of all economic units in the United States, taken, as will be seen

⁸⁶ The value of reproducible wealth in 1880 prices was about \$26 billion (R. R. Doane, *Anatomy of American Wealth*; Harper, 1940; pp. 262-3). From 1862 to 1876 wholesale prices were substantially above the 1880 level.

⁸⁷ Doane, *Anatomy* . . . , p. 26 for 1938. An estimate by the National Industrial Conference Board (*Enterprise and Social Progress*, 1939, p. 58) for 1937, however, gives only \$322 billion; one by the National Resources Planning Board (*The Structure of the American Economy*, 1939-40, p. 374), \$365 billion for the mid-thirties.

⁸⁸ The value of land in 1938 was estimated by Doane (*Anatomy* . . . , pp. 248-9) to be \$117 billion.

⁸⁹ These rough estimates are based upon material in other papers in this volume, supplemented by some still rougher guesses for missing items.

in Section D, at the market value of assets and liabilities. It does not mean that differences between the figures for different years indicate a change of the same proportion, or even in the same direction, in tangible assets—in whatever unit measured—let alone an equivalent change in the utility of the stock of future services incorporated in the assets constituting national wealth. Comparisons of national wealth at different dates or of different countries in such physical or psychic terms require adjustments going far beyond the scope of national business accounting. They make sense only under economic accounting. National wealth, as derived by the methods of business accounting, lends itself to only a small degree to intertemporal or international comparisons. Estimates can, however, be used to compare the structure of national wealth at different points of time or in different countries, i.e., the distribution of total wealth among types of assets and among groups of ultimates and intermediaries.

Even under economic accounting, the comparison of national wealth estimates over time and space is difficult. The difficulties revolve around the degree to which national balance sheets, and hence national wealth estimates, can or must be standardized. In one direction standardization is, of course, complete wherever economic accounting is applied. Since balance sheets, as well as other entries in the national accounts, are based on the same set of economic principles, the methods of valuation and the scope of imputation are the same whatever the area or the period. As far as economic accounting is applicable at all, the methods followed in constructing the national balance sheet and measuring national wealth are therefore identical and the resulting figures comparable. The question when and where the principles of economic accounting become inapplicable may be answered roughly by saying that they are applicable to every society that meets three tests: absence of unfree labor; freedom of consumers' choice; determinability of marginal cost.

But identity of methods of valuation and consolidation still leaves differences in prices, incomes, and rates of capitalization

as obstacles to intertemporal or international comparability of national wealth estimates and national balance sheets. Standardization can be essayed in two ways: by deflating the original figures expressed in terms of national currencies or by constructing indexes of the volume of assets.

The first step on the road to standardization by deflation is implicit in economic accounting. As already stated, an accounting unit of stable purchasing power takes the place of the fluctuating national currencies in which business accounts are traditionally kept. It is only a small further step—and one quite in keeping with the principles of economic accounting—to make this unit of world-wide applicability, i.e., to reduce the original figures not to a base period national price level, but to a base period international level. The practical difficulties are undoubtedly great, but precedents are not wholly lacking.⁴⁰ The next step, the standardization for differences in rates of capitalization (other than pure interest), is considerably more difficult and controversial. The two steps can be combined by deflating national wealth estimates by means of an index of physical asset prices, probably the preferable procedure whenever these prices can be ascertained.

Even after these two adjustments, two economies possessing the same tangible assets may show different figures for national wealth—*nota bene*, in international units. Since differences in price levels and capitalization rates have already been eliminated, this can happen only if the net yield (in international units) of identical assets differs. The main reasons would be a difference in the division of the product between wages and profits, which in turn might be due to a difference in the quantity of capital per head and the greater or lesser importance of the rent of land. Apart from the difference, comparisons in terms of national wealth so deflated will approximate relations indicated by an index of assets.

The second approach aims directly at a measure of tangible assets. In principle, the difficulties of constructing an appro-

⁴⁰ See, e.g., Colin Clark's use of IU, i.e., a unit of purchasing power of the U.S. dollar during 1925-34 (*Conditions of Economic Progress*, London, 1940).

priate index are the same as those encountered in preparing an index of production. In practice, the obstacles are likely to be greater, chiefly because of the difficulties of ascertaining the age, number, and condition of assets of a given type, and of establishing a satisfactory classification of assets. In most cases it will be necessary to use a simple physical dimension as a rough indicator of quantity; e.g., the cubage of buildings, the horsepower of certain types of machines and transportation equipment, or the surface of soil of a given quality. It will usually be more difficult also to determine the weights to be applied to the different types of tangible assets. Notwithstanding these difficulties we should often be able to derive a measure that could be used as a check on deflated current national wealth estimates. Geer Stuvel, in a paper, 'Development of Stock of Capital Goods in Six Countries since 1870', presented at the 1949 meeting of the International Association for Research in Income and Wealth, made an attempt in this direction. Comparison by means of such an index is possible only as between periods or countries broadly similar in the physical character of their assets. The limitation, though perhaps less immediately evident, applies also to comparisons between deflated current national wealth figures.

Whether intertemporal or interspatial comparisons of national wealth are made by deflating current national wealth figures or by indexes of tangible assets will depend a good deal on the availability of material, particularly the relative quantity and quality of data on prices and on physical stock. Whenever possible, of course, both methods should be used.

D VALUATION OF ASSETS, LIABILITIES, AND EQUITY IN THE NATIONAL BALANCE SHEET UNDER BUSINESS ACCOUNTING

1 *The Basic Problem*

In evaluating combined net worth in a system of business accounting, we must likewise follow the practices customary in business and sanctioned by law at the time and the place to which the estimates apply. Here, however, a serious dilemma

arises. Business balance sheets differ according to their purpose, and important items are valued differently. Two types of balance sheet are relevant. The ordinary, general purpose periodic (usually annual) balance sheet and what may be called the liquidating balance sheet, a type applicable also in the case of the organization of a new business, merger, or the sale of an enterprise as a going concern. The main objective of the ordinary balance sheet, as many accounting theorists now contend, is to help in determining profit and loss on current operations.⁴¹ In the liquidating balance sheet, on the other hand, the emphasis is on the correct determination of the status of the enterprise as of a given date without much regard to current operations.⁴²

The differences between the two types of balance sheet are especially evident in the methods of valuation, particularly in those for fixed assets and accrued items. The nature of the differences is always the same. The liquidating balance sheet tends toward current market value, while the periodic balance sheet tends toward original cost value, although there has been some tendency, more pronounced in accounting theory than in practice, to substitute replacement cost for original cost.⁴³

Which type is proper for the national balance sheet depends to some extent on the purpose. As far as the purpose of the balance sheet is to reflect the situation at one time—and that has hitherto been the primary goal of national wealth measurement—the status balance sheet and its valuations would seem appropriate. This conclusion is reinforced by one important consideration. Only under the valuation appropriate to the

⁴¹ One of the earliest and certainly one of the most consistent and influential proponents of this view is Eugen Schmalenbach (*Grundlagen dynamischer Bilanzlehre*, published in 1919; the last, sixth edition, was published in Leipzig, 1933 under the title *Dynamische Bilanz*).

⁴² In the case of banks and many other financial institutions, even periodic balance sheets are strongly influenced or even dominated by considerations of status.

⁴³ That this discussion has hitherto remained mainly theoretical in this country may be because the United States has not experienced a long drawn out severe inflation since accounting became articulate.

status type balance sheet is it possible to make a meaningful comparison of the assets of different groups of units and their shares in national wealth. The conclusion, therefore, is that generally the unit balance sheets to be consolidated should be of the status type, i.e., all assets, liabilities, and equities are valued at the market price, or the closest possible approximation.⁴⁴ What does this mean for individual items of the unit balance sheets and the consolidated national balance sheet?⁴⁵

2 *Reproducible Tangible Assets*

Tangible assets are of two main types which differ markedly: reproducible and nonreproducible. This division is one of common sense, not of the strictest verbal logic. Only land (excluding all man-made improvements), subsoil assets, works of art, and collectors' items (such as rare books and stamps) are regarded as nonreproducible, even though some items in the last two categories might technically be duplicated. On the other hand, reproducible assets comprise every other tangible asset, although many if not most can hardly be duplicated in exactly the same form or spot.

Reproducible assets may be subdivided according to their physical nature into as few or as many categories as the specific

⁴⁴ Professor Kuznets, in his summing up, proposes in effect to use depreciated original cost adjusted for price changes in preference to market price. In practice the difference between the two should not be large, especially if the original cost of the different types of assets is adjusted by special cost indexes rather than by an index of the general price level. Moreover, dearth of material will compel us in some cases to use adjusted original cost instead of market price, and vice versa. As a practical matter I am therefore not inclined to take strong issue with Professor Kuznets. Theoretically, however, I still prefer current market price, especially since it is the only way to apply consistent principles of valuation to reproducible and nonreproducible assets and the substantive and claims approaches.

⁴⁵ Selection of the status type balance sheet as the medium of national wealth measurement involves the total-net-worth approach to the national balance sheet in connection with the national income account (cf. C 4 above). For purposes of national income measurement and analysis, and particularly for the calculation and analysis of saving, there will be need, in addition, for a national balance sheet of the periodic earned-net-worth type.

purpose of the study requires and the data permit. For a general analysis of national wealth the following classification should as a rule suffice: improvements to land, such as fences and drainage ditches; buildings; other structures, such as dams, roadbeds, and streets; livestock; machinery and other equipment; inventories of raw materials, semifinished, and finished commodities; monetary stocks of precious metals; consumer goods in the hands of households and collectives.

Valuation and other measurement problems peculiar to these different categories of reproducible assets are treated in the papers dealing with specific forms of national wealth. The discussion here is, therefore, confined to the more important problems of valuation under business accounting at market price or the nearest approximation common to all or many categories of reproducible assets. These problems can be subsumed under three headings: (a) the relation of the value of reproducible assets as discrete entities and as parts of a going concern; (b) the representative character of the market prices used as the basis of evaluation; (c) the determination of the nearest approximation when the market price is not to be had.

a) When reproducible assets are valued at their market price it is always their price as discrete entities that is used, since only as a discrete entity can an asset have a definite market price and only as a discrete entity does it usually become the object of an actual market transaction. This market price is determined, at least under perfect competition, by the asset's marginal utility expressed by the lowest bid among the buyers who are needed to clear the market. In all other intramarginal uses the asset may be valued higher, in the sense that people are willing to pay more than the market price rather than do without. But such consumers' or producers' surpluses flowing from intramarginal uses cannot affect the valuation of the asset as a discrete component of national wealth. Consumers' surplus is a psychic income which does not enter into national wealth at all. Producers' surplus, on the other hand, becomes part of monopoly or going concern extra profit. Reflected in

the market price of the asset owner's equity, it becomes part of the valuation difference.⁴⁶

b) The determination of the market price of discrete reproducible assets raises two fundamental technical problems. Can the market price for the limited number of actual transactions in one type of asset be used as a basis of evaluation for the whole stock of that or even of related types? What value shall be used if no market price in the strict sense of the word exists?

For few types of reproducible assets can a continuous nationwide market be said to exist in the sense it does for stock exchange securities or foreign exchange. Standardized raw materials and a few semifinished goods are practically the only commodities to which this applies and their total value comes to only a very few percent of total national wealth.⁴⁷ For most types of reproducible assets the individual specimens are usually not equal, and therefore not freely substitutable. For this reason their market is local rather than national, and transactions are intermittent rather than continuous. But in the United States at least, transactions, both in absolute number and in relation to the stock, taking place within a relatively short period, say three months, of the date to which the national wealth estimate applies, are sufficiently numerous for some of the most important categories of reproducible wealth to permit the establishment of a reasonably reliable relation between certain characteristics of the units actually changing hands and of the entire stock, and thus an estimate of the assumed market price of the entire stock. This is the case particularly for residential housing, several types of commercial buildings, trucks, and some of the most important types of

⁴⁶ We do not have to worry here to what extent the market price of a lone asset is determined by its capitalized expected net yield. That is a question for valuation under economic accounting where the market price itself, here taken as a datum, may become a problem. Practically speaking, moreover, valuation at capitalized expected net yield is feasible only for entire enterprises as going concerns and for a few types of assets with relatively large unit value and yet of nearly standardized nature and management, particularly rental housing.

⁴⁷ In 1939 the value of inventories of raw materials, according to estimates of the Department of Commerce, was about \$4 billion, equivalent to about 1 percent of national wealth.

durable consumer goods such as automobiles. As an example of such a relation, the market price of one-family houses may be tied to their assessed value by an index derived from a sample of houses changing hands; or to their original cost, due regard being paid to differences in age; or to the current cost of a house of the same cubage and layout, after proper adjustment for accumulated depreciation.

In all these cases where the stock is evaluated on the basis of the market price of a small proportion of the species actually changing hands shortly before or after the date of the national wealth estimate, it is essential that the units changing hands constitute a 'representative sample'. This does not mean that the different varieties of the asset evaluated must be represented in the same proportion among stock and units changing hands. But it does mean that actual market prices must be weighted for different varieties, so that no systematic bias remains, and the sample of units changing hands can be blown up without significant distortion to the universe, i.e., the total stock of this type of asset. Undoubtedly the precautions necessary to obtain an unbiased blow-up have often been neglected, and sometimes the detailed data required for an unbiased blow-up are unavailable. An example of such dangers is afforded by the so-called 'float' in real estate valuation; valuing all units on the basis of those changing hands, which probably are more marketable than the rest, may easily lead to an overvaluation of all real estate in the national balance sheet.⁴⁸ It is also evident that the larger the amplitude and the greater the frequency of price fluctuations of an asset, the more serious the difficulty of obtaining a representative sample from the transactions occurring during a relatively short period near the balance sheet date.

This viewpoint should dispose of the argument that national wealth figures are meaningless because they rest on the actual sale of only a very small proportion of the total stock; and because—and this is regarded as an even more telling point—prices would be quite different, presumably lower, if all the

⁴⁸ For this argument see H. W. Singer, *Economic Journal*, Sept., 1946, p. 481.

stock were offered for sale at the same time. All valuations in business accounting are made on the assumption that any one unit may take for granted the price structure prevailing at the time the balance sheet is struck. This presupposes that the liquidation of the one unit would not affect the price of any assets it holds taken discretely. National wealth, in a system of business accounting, reflects existing relative values—that of the monetary unit being one—at prevailing velocities of turn-over of assets. The application of the actual prices realized on the sale of a small part of the stock to the entire stock is as legitimate as any blow-up of a sample and must be judged by the same criteria.

c) For some important types of reproducible assets no market prices exist, either because the items are too specialized and sales too infrequent or because items of such type are never, or almost never, bought and sold. The first reason applies to many items of machinery and equipment and industrial buildings; the second to all the assets of public or private collectives that are not of a type used by households or business enterprises. In most cases, however, when the market price is unavailable, depreciated replacement cost may be substituted. The main reason this substitution is generally possible is that the accountant regards the life of a business enterprise, as well as that of a private or public collective, as eternal in the same sense as that of a national economy. Hence he assumes that assets will be replaced when worn out, either by physically identical assets or by assets equivalent in terms of value or of productive capacity; and goes so far as to regard the balance sheet value of tangible assets simply retrospectively as unrecovered costs or prospectively as an as yet unused replacement fund.

Depreciated replacement costs can be approximated in two ways. The first leads to two steps—the calculation of the new cost of an identical item, the test being equivalence in use rather than physical similarity; and the reduction of this cost in proportion to the expired part of the useful life of the old asset. The second approach is the correction of the balance sheet value—usually the depreciated original cost—by an ap-

propriate price index, as a rule, an index of construction costs or of the price of the relevant type of equipment, such as automobiles or machine tools. In practice, especially for large aggregates, the second approach must usually be followed; in this case indexes as multipliers fortunately lose some of their danger.

In so correcting balance sheet values care must, of course, be taken that the original values are comparable. This means practically two things: that the age distribution of the existing stock is known or can be approximated so that the appropriate index corrections can be applied; and that the methods of depreciation have been identical or that the necessary adjustments can be made to render the resulting depreciated cost figures comparable. This correction does not involve two of the really difficult problems in the field of depreciation accounting: whether the straight line method still prevailing in business is adequate; and whether the length of useful life assumptions made by business are unduly optimistic or pessimistic, leading to an under- or overstatement of unamortized cost.

The younger the asset the closer the depreciated replacement cost is to what the market price might be expected to be. Hence the substitution of depreciated replacement cost for market price is not very problematical for assets with a useful life of up to about a decade. For very long lived assets, and particularly for those that are not likely to be replaced by similar assets, the substitution is subject to more serious reservations. But such assets represent only a minority of the total wealth of a nation, as they do not include land, most movable equipment and durable consumer goods, and even part of buildings.

From the viewpoint of business accounting, what matters is a reasonably close approximation to the market price. Hence either substitute is acceptable: an engineering estimate of replacement cost adjusted for the elapsed proportion of useful life or depreciated original cost times the ratio of the market price to the depreciated original cost as shown for comparable

assets. These two substitutes are the upper limit for constructive market price. The lower is scrap value. It will be applied—when the market price is unascertainable—if the asset is not in use and not intended to be put in use; or in the case of large items that cannot be operated outside a going concern, if prime costs are continuously not covered.

3 *Nonreproducible Tangible Assets*

a) Nonreproducible tangible assets, mostly land, now account for less than one-third of the national wealth in the United States, but in some less industrialized countries probably for most wealth (Table 3). There are few estimates of the proportion of land in total national wealth, as only a minority of all national wealth estimates give separate figures for the value of land excluding improvements. The figures should be taken merely as indicating the order of magnitude. They cover only land; they omit other nonreproducible assets, which, however, are of very minor importance in the over-all picture; they are not always compiled strictly in accordance with the rules of national business accounting; and they are not entirely comparable over time and between countries. Within these limitations they are interesting and significant.

The main fact emerging from Table 3 is that the proportion of land in national wealth has declined ever since our data began. In Great Britain, the only country for which the ratio can be approximated if not measured for more than 250 years, it has fallen from over 50 percent in the late 17th century to about 10 percent at present, most of the decline occurring during the 19th century. In the United States the decline has not yet gone as far, but it has been pronounced and persistent: from about 50 percent in 1870 to about 30 percent in 1938.^{48a} In a few eastern states (Connecticut, Rhode Island, Vermont) the proportion is less than 20 percent, while it is still above 40 percent in some of the midwestern, mountain,

^{48a} Reexamination of the data makes it likely that the proportion of land in United States national wealth since 1922 is smaller than Table 3 indicates.

and western states.⁴⁹ In most other, chiefly European, countries for which data are available, the ratio in the 20th century is about one-third.

⁴⁹ Doane, *Anatomy* The figures refer to 1930

Table 3
Percentage Ratio of Value of Land to Total
National Wealth

COUNTRY	YEAR	%	SOURCE OF BASIC ESTIMATES
United States	1870	50	Bureau of the Census; Kuznets, <i>National Product since 1869</i>
	1890	41	
	1912	37	
	1922	34	
	1928	31	Doane, <i>Anatomy of American Wealth</i>
	1938	30	
Great Britain	1688	55-60	Gregory King, 'Natural and Political Observations and Conclusions upon the State and Condition of England, 1696' (first published as an appendix to George Chalmers, <i>An Estimate of the Comparative Strength of Great Britain</i> , London, 1802)
	1800	43	Beake (cited in Robert Giffen, <i>Growth of Capital</i> ; London, 1889)
	1865	30	Giffen, <i>Growth of Capital</i>
	1885	17	
	1932-34	10	Based on Hicks, <i>Social Framework</i> (1942), p 103
Germany	1911	23	K. T. Helfferich, <i>Deutschlands Volkswohlstand, 1888-1913</i> (Berlin, 1917, 7th ed.)
France	about 1890	34	Alfred de Foville, 'The Wealth of France and other Countries', <i>Journal of the Royal Statistical Society</i> , LVI, Dec. 1893
Italy	1924	36	Gini (cited in Winkler, 'Volksvermoegen', <i>Handwoerterbuch der Staatswissenschaften</i> , VIII, 1928)
Hungary	1930	32	Friedrich Fellner, <i>Das Volksvermoegen Ungarns</i> (Berlin, 1930)
Argentina	1916	32	A. E. Bunge, <i>Riqueza y Renta de la Argentina</i> (Buenos Aires, 1917)
Australia	1903	38	T. A. Cochlan (cited in A. G. Webb, <i>New Dictionary of Statistics</i> ; London, 1911)
Japan	1905	37	K. Mori, 'Estimate of the 'National Wealth and Income of Japan Proper', <i>Bulletin de l'Institut International de Statistique</i> , Vol. 25, Part 2
	1924	32	

b) In the valuation of nonreproducible assets we face neither choice nor dilemma. Market price is the only value to be considered, since by definition there is no replacement cost and the original cost to the owner has little meaning in a consolidated status type balance sheet.

Land is by far the most important type of nonreproducible asset. Even if narrowly defined—as it must be—to exclude every man-made improvement, the value of bare land probably accounts for well over 90 percent of all nonreproducible assets. Once the main types of land are treated separately (urban, agricultural, forest, and waste land would seem to be the minimum), land is sufficiently homogeneous in economic character and sufficiently regularly bought and sold to permit the determination of fairly reliable market prices.

There is, however, one important technical difficulty. For urban land, and to some extent also for agricultural land, actual transactions comprise both land and improvements, and in the case of urban land the latter generally account for most of the sales price. Hence it is necessary to divide the reported market prices into the two basic components to obtain prices for land proper. Several methods have been developed, greatly aided by the fact that the assessed value of real estate in many cases gives the value of both the improvements and the land.⁵⁰

Land held by public and private collectives would not seem to present a special problem although it does not as a rule reappear on the market once it has passed into collective ownership. There is almost always privately owned land of comparable type and location and the price realized for it can be applied, sometimes only after appropriate adjustments, to the acreage held publicly. Even the land taken up by streets could be evaluated on the basis of the market price of adjoining privately held land.

c) The valuation of subsoil assets, which may be regarded as a special type of land for purposes of national wealth measurement, has bothered economists greatly, and under national

⁵⁰ See, e.g., Doane, *Anatomy . . .*, and Kuznets, *National Product since 1869*, pp 202 ff. Cf. also note 48a.

economic accounting there really are serious problems. They do not arise under national business accounting, where again market price is definitely the appropriate basis of valuation.

For some types of subsoil assets, e.g., oil lands in the United States, the market is active enough to admit of applying current prices directly to total acreage. In most instances, however, the valuation has to be indirect. The value of mining land is determined by subtracting from the market price of the mining enterprise the depreciated replacement cost of the reproducible assets and the net of other assets. Only as a last resort should valuation be based on development costs adjusted for price changes and the proportion of the estimated mineral content already mined.

All these values—except adjusted development cost—are directly or indirectly derived from three main factors: the estimated mineral content of the mine; estimated net profits, i.e., the difference between estimated future prices and the cost of production; and the interest rate, or rather the capitalization factor, used to discount estimated net profits. The fact that the mineral content may last much longer than the period customarily taken into account in business calculations which are strongly influenced by the level of interest rates—the higher the rates the shorter the period after which the present value of any future net profit becomes negligible⁵¹—is immaterial for business accounting.

d) Other nonreproducible assets—works of art and other collectors' items as well as historical monuments and the like—are generally omitted from calculations of national wealth. Except possibly for historical monuments of a national character, there is no reason for such an omission as a matter of principle. Nor would the practical difficulties of estimating at least the order of magnitude seem insuperable. The market for the most important types of collectors' items is broad and reliable enough and the assessment of relative values fine

⁵¹ At an interest rate, including risk premium, of 5 percent the present value of \$100 falls below \$1 after not more than 95 years; if the rate is 10 percent this level of practical insignificance is reached for returns less than 50 years distant.

enough to permit the use of the prices prevailing in it as the basis for estimating the value of the entire stock, whether privately or publicly owned.⁵² The technical difficulties of arriving at an over-all estimate lie, indeed, less in uncertainties about market prices than in lack of information about the size of the stock.

These difficulties preclude any close measurement, but not a rough estimate of the order of magnitude. Even such an estimate would require special study. The guess may, however, be hazarded that the grand total for the United States will be only a few billion dollars and probably less than 1 percent of total national wealth.

4 *Claims and Liabilities*

The valuation of claims and liabilities for the purpose of a consolidated national balance sheet, prepared in accordance with the rules of business accounting, gives rise to fewer problems than that of any other large balance sheet item. The reasons are that both claims and liabilities are as a rule carried at face value, face value is easily determined, and the exceptions are neither numerous nor difficult.

There are, however, two important exceptions to the rule of face valuation, apart from the less important and evident further exception that when balance sheet date and interest payment date do not coincide, periodic balance sheets must contain appropriate allowance among liabilities for accrued but not yet paid interest and among assets for prepaid interest.⁵³

The first exception is the reduction of face value—sometimes down to zero—when payment is doubtful. This adjustment is

⁵² One might even go so far as to say that the quality of the price quotations for some collectors' items is superior to that for many far more recognized constituents of national wealth. A good part of these prices are established at public auctions and for some types, e.g., stamps, elaborate catalogues give asked, if not market, prices.

⁵³ These allowances in no way differ from the parallel allowances, appearing on both sides of the balance sheet among accrued items, for prepaid or unpaid rent, taxes, or services.

generally made not by reducing the face value of individual claims but by setting up a so-called reserve which is, of course, deducted from the total face value of claims when it comes to consolidating the balance sheets of individual units. These reserves for doubtful claims—doubtful because of question about the solvency of the debtor or about the validity of the claim in the amount entered in the books—cannot always be disentangled to yield a correct figure for the presumed market value of claims. These shortcomings, however, are not very serious in the case of business enterprises and may easily be remedied by a slight improvement of basic statistics or even a more thorough analysis of existing material. It may be doubted, indeed, that the total of these reserves for bad debt at the end of an average year much exceeds \$1 billion,⁵⁴ and the amount unidentified among reserves is naturally smaller still.

The second exception is provided by claims, usually long term, that have a market price, such as bonds and other evidences of indebtedness traded on stock exchanges or in the active over-the-counter market. For other claims face value, after deduction of probable losses, is a sufficiently close approximation to the market price. But these marketable claims must be carried in the combined national balance sheet at the actual market price, even though they appear in the actual balance sheets of some of the most important categories of holders, such as commercial banks and life insurance companies, at original cost, convention values or some other, often hybrid value.

The consolidation of the claims and liabilities of individual units into the national balance sheet, however, raises a problem different from those just discussed. Liabilities are entered in debtors' balance sheets at par, even though the creditor may have written off in his books part or all of the entire corresponding claim. Only when a debtor goes through bankruptcy or similar proceedings is the balance sheet value of his liabilities written down. When that happens, of course, the deductions

⁵⁴ Deduction for bad debts taken by corporations averaged about \$0.9 billion for 1927-42 (*Statistics of Income for 1942*, Part 2, p. 324).

made in the creditors' books may turn out to be too small or too large. At any one time, however, the deductions for doubtful debts in creditors' books are not matched by similar allowances in those of debtors. Hence when all balance sheets are consolidated, a residual net liability remains. Such an item is obviously meaningless, and must be eliminated in the consolidated balance sheet. This is a purely formal affair for the national balance sheet. For the combined or consolidated balance sheets of groups of units there is a statistical problem of allocating total allowances for doubtful claims found in the books of the various groups of creditors among the appropriate groups of debtors.

Another technical problem arising in the consolidation of balance sheets deserves mention at least. A prerequisite to a correct consolidation is that the two sides of a creditor-debtor relation be entered in both balance sheets in exactly parallel fashion, particularly that they be entered as of exactly the same point of time. If bank deposits are measured on the basis of bank reports, checks in the mail over the balance sheet date must be added back to drawers' balances if the latter are derived from their own balance sheets, as happens, e.g., when deposits of households are estimated from bank reports and those of business from their balance sheets. Similarly, checks in the mail will already have been written off their balance by the sender, but not yet added to theirs by the recipient even if balance sheets are used as the basis of measurement in both cases. Inversely, invoices in the mail appear among the accounts receivable of the creditor, but not yet among the accounts payable of the debtor. Unless the necessary precautions are taken in adjusting balance sheets before consolidation a meaningless 'float' will appear among either assets or liabilities, and the debtor or creditor position of certain groups of units may be distorted.

Foreign claims and liabilities present only one additional problem—the selection of the appropriate exchange rate. This, however, is a question only when official and free exchange rates differ or—what usually happens at the same time—when

disposition over foreign claims is hampered by transfer restrictions. Such difficulties are ordinarily taken into account in business balance sheets by appropriate deductions from the face value of such claims.

5 *Intangibles*

To judge by published balance sheets the quantitative importance of intangibles is small. Among 1,741 corporations registered with the Securities and Exchange Commission—mostly large nonfinancial enterprises—about half showed intangibles of some sort in their 1937 balance sheets, but the total value was only \$1.8 billion before and \$1.1 billion after reserves, or 3 and 2 percent respectively of total assets.⁵⁵ These figures may, however, understate the actual importance of intangibles since probably most cases reflect original cost rather than what might be regarded as current market value.

In principle, intangibles should be carried in the national consolidated balance sheet at their market price. It, however, is difficult to determine not only because of the dearth of appropriate data but also because many intangibles—and goodwill in the narrower sense entirely so—are so closely tied to the owning enterprise that they could hardly be sold separately, and hence really do not have a market price as discrete assets. Probably little can be done except take the valuations as they appear in available balance sheets of business firms and extend them to cover all business enterprises.

There still remains the problem of the value to be put on the intangibles owned by households—chiefly copyrights and patents—and the presumably very small amounts of such intangibles that are held by private and public collectives but are not made available free of charge and hence are without monetary value under a system of business accounting. The amounts are probably too small to make the omission, common to all national wealth estimates, of consequence.

⁵⁵ *Statistics of Listed American Corporations* (1940), Part 1, p. 202.

6 *Equities*

Equities appear twice in the balance sheets of many units, and hence in the early steps of their consolidation into a national balance sheet: once on the left side, particularly of households but also of parent corporations and of certain types of financial institutions such as holding and investment companies; and again on the right side as net worth, often divided into several capital stock and surplus accounts and also including reserve accounts to the extent that these are excessive for their designated purposes.

The valuation of equities on the asset side is clear in principle and as a rule does not encounter serious technical difficulties. Such equities are valued at their market prices, which are determinable with ease and with as much reliability as is possible for any type of asset, except monetary claims, for all stocks actively traded on securities exchanges or in the over-the-counter market. Whether such quotations always accurately reflect the 'intrinsic value' of the shares—a term probably meaning the best long range estimate of the capitalized value of expected net earnings—is beside the point in national business accounting. It is enough that the prices are formed, with occasional exceptions, in as open and broad a market as exists anywhere.⁵⁶

Difficulties arise only in the case of the shares of closely held small and medium size corporations. For these the appropriate price per share can be determined by one of two main methods. In principle, the preferable way is to value such shares by analogy with comparable shares actively traded in. This generally means applying a capitalization factor (derived from price-earning or price-dividend ratios for active stocks, or a more complex relationship that might be obtained by correlation analysis) to the earnings or dividends of the small closed corporations. When there are no comparable enterprises whose

⁵⁶ Josiah Stamp, 'The National Capital', *Journal of the Royal Statistical Society*, Part I, 1931, XCIV, 5, 16-7, emphasizes the difference between the value of the equity derived from stock market quotations and that obtainable from the sale of the enterprise as a whole. This difference, however, calls for the introduction of the 'valuation adjustment' discussed in Section B2, not for the abandonment of market prices of stocks in national balance sheets.

stocks are actively traded or it proves impossible to disentangle enterprise profits from the salaries of the owner-operators, resort may be had to the book value of total net worth per share, either in unadjusted form or after the assets of these small enterprises are shifted from the book value basis, i.e., generally original depreciated cost, to the current market price basis. Until fairly detailed studies of the constructed market price of shares of enterprises not actively traded are made, it will probably be necessary to rest content with book values, possibly roughly adjusted for changes in the price level of commodities.

The value, for inclusion in the consolidated national balance sheet under business accounting, of equities in the sense of the total net worth of all ultimate economic units, presents no problems of its own. Once all the assets of the ultimate economic units have been valued at actual or constructed market price and the net balance of foreign assets and liabilities has been determined, the figure for net worth emerges automatically, since in the process of consolidation the equities of all intermediaries will disappear, as well as their assets and liabilities.

On general considerations one would assume that the going concern value of the assets of business enterprises would exceed their book value. While comprehensive statistical data are difficult to find, those now available make it doubtful that such a relation obtained in the United States between 1930 and World War II. At the end of 1937 the market value of the stock of the 10 largest American industrial, 10 largest railroad, and 10 largest public utility corporations, i.e., those showing the largest assets according to their books,⁵⁷ totalled \$12.7 billion, while the book value of their equity was \$19.9 billion. In only two of the 30 corporations, both industrials, did the market value exceed the book value. For the 30 corporations together

⁵⁷ See the *Distribution of Ownership in the 200 Largest Nonfinancial Corporations* (TNEC Monograph 29, 1940), App. III (the Ford Motor Company is excluded as its stock is not traded). Market values are taken from this publication, book values from the balance sheets as published in Moody's manuals.

the market value was only 64 percent of the book value; the ratio was 91 percent for industrials, 20 percent for railroads, and 69 percent for utilities. There is, however, reason to believe that the market price-book value ratio is considerably higher for all corporations and was higher in 1946 than in 1937. First, among all corporations, railroads and public utilities—for which the ratio is especially low—account for only a little over 20 percent of the book value of the equity; in the sample of 30 giant corporations the ratio was 60 percent. Secondly, for medium size and smaller corporations the ratio is probably higher than for very large corporations. Thirdly, since 1937 market values have increased considerably more than book values.⁵⁸ Even now, however, the market value of all business enterprises is probably only little above the book value of their equity. There are, of course, important groups of enterprises for which the market value exceeds the book value of the equity, but this difference is apparently almost completely offset by an excess of book over market value in other groups, primarily railroads and public utilities.⁵⁹

E FUNCTIONS OF NATIONAL BALANCE SHEETS AND NATIONAL WEALTH ESTIMATES

Having indicated in Section A the functions of social accounting and reviewed in Sections B-D the methods by which national balance sheets and national wealth measurements are derived, it remains to state the use of such figures, i.e., what economic questions they may help to answer. This statement

⁵⁸ Common stock prices increased nearly 50 percent between the end of 1937 and the end of 1946. The book value of the equity of all corporations, on the other hand, increased only from \$142 billion in 1937 to \$146 billion in 1945, the last year for which the statistics of the Bureau of Internal Revenue were available.

⁵⁹ The excess of the book value of the net worth of large American corporations in 1937 over the stock exchange value of their equity seems to be due primarily to the negative difference between the market value of the assets taken discretely and as going concerns—a reflection of low expected earnings—rather than to a book valuation of the discrete assets in excess of their depreciated replacement cost. Hence the difference would constitute a true negative valuation difference in the national balance sheet.

will be short and more in the form of an enumeration than a substantive discussion. Adequate treatment of the conceptual and statistical problems arising in the use of national balance sheets in the economic analysis of the subjects enumerated, from the viewpoint of both national business and economic accounting, would possibly take as much space as the rest of the paper and would have to include a good deal of discussion fairly far removed from the narrower field of national wealth measurement.⁶⁰

While this answer to the question of the purposes and uses of national balance sheets and national wealth measurements will be considerably more positive than that given by Professor Kuznets ten years ago—possibly due more to differences in temperament than to the accumulation of thought and additional data—there is agreement on one negative conclusion. National wealth estimates are indeed not well adapted, or at least not as well adapted as national income figures, to fulfil demands often made of them: comparison of economic progress over time and the analysis of the burden of debt or taxation.

If these limitations of the discussion are accepted, the likely uses of national balance sheets in general and of national wealth estimates in particular may be arranged under ten headings. All represent functions that could not be performed, or at least not as well, by national income data.

1) Analysis of the composition of physical (tangible) assets, for an entire economy or for certain sectors, is undoubtedly one of the most important uses of national balance sheets. It involves, among other things, comparisons in value terms between the amount and nature of physical assets used by different industries; between assets used for production, comfort, and other purposes; between reproducible and nonreproducible assets; and between assets of different ages and life expectations, particularly between what is often called the fixed and the circulating capital of the community. Much economic theory, especially in the field of capital, interest, and money,

⁶⁰ Even Kuznets' discussion, which runs to twenty pages, is in fairly general terms ('On the Measurement of National Wealth', Sec. IV).

needs the factual data provided by such an analysis of the composition of the stock of physical assets. So does the general theory of production, since this analysis answers part of the question concerning the combination of factors of production in actual life.

2) Of at least equal importance is the analysis of the combined and consolidated balance sheets of different groups of ultimate and intermediary economic units and of typical balance sheets of their members, in order to ascertain the relations between asset structure and economic behavior. These balance sheets reflect the selection and management of assets on the part of the owners and in turn exercise considerable influence on the owners' actions in the future. Analysis is, therefore, essential for a realistic understanding of problems such as liquidity preference and saving habits. Further comment may be omitted since motivating relationships in national accounting, and in particular in national balance sheets, are the subject of Professor Hart's paper.

3) The distribution of total national wealth among the members of a community has always been a favorite topic among professional and lay students. It remains among the most important uses of national balance sheets, even though it loses its preeminent status once the measurement of national wealth becomes part of a comprehensive analysis of the national accounts. Figures on the distribution of both total assets and of net worth among the age, occupational, ethnic, local, and other groups of ultimate economic units as well as data on the size distribution of gross and net estates (i.e., total asset holdings and net worth as the difference between assets and liabilities) have wide sociological and economic uses. If properly handled, they can help answer questions concerning the concentration of wealth; tendencies toward or away from property ownership by various classes; and the connections between distributions of income and of property. They can, e.g., put in the right light the naive attempts to prove that all is well by citing the large number or the high proportion of individuals who own certain types of assets, such as bank deposits, government

bonds, life insurance policies, automobiles, and houses, without bothering to state how aggregate or average holdings compare with those of other much less numerous groups of ultimate owners; how much the ownership of these assets contributes to the owners' current income; and how total holdings compare with personal incomes.

4) An often ignored aspect of the distribution of national wealth is automatically brought into focus when the problem is approached from the viewpoint of a system of national accounts: the comparison between the ownership and management of tangible and other assets. From many points of view, especially that of economic policy, it matters much less who the ultimate owner of an asset is, particularly a physical asset, than who controls and manages it directly or indirectly. All physical assets are ultimately owned by households or collectives, but many, and just those most significant in modern economic life, are immediately owned and managed by intermediaries, mainly business corporations. They are thus in fact controlled by a group of persons quite distinct from, and almost always much smaller than, the ultimate owners. The tracing of these relationships through the often quite involved chains of ownership, based on the combination and consolidation of the balance sheets of different layers of intermediaries, is an important function of national wealth analysis. If such analysis were better understood, not only by the general public, we would have been spared the spectacle of specialists trying to construct a contradiction between the figures usually given about the high degree of concentration of wealth and the fact that the use of houses, farms, and durable consumer goods, which together constitute a large proportion of total national wealth, seems to be fairly equally spread over the entire population.⁶¹

5) Considerable doubt has been expressed about the usefulness of the ratio of national wealth to national income, par-

⁶¹ See Doane, *Anatomy . . .*; and E. A. Keller, *A Study of the Physical Assets, sometimes called Wealth, of the United States, 1922-33* (University of Notre Dame, 1939).

ticularly for an entire country, as a tool of economic analysis.⁶² This ratio, indeed, can always be resolved into two others, at least as meaningful in themselves: the share of property income in total national income and the average rate of capitalization. The wealth-income ratio is, nevertheless, neither superfluous nor worthless. As a matter of fact it has a distinct use, especially if calculated for groups of individuals or enterprises and collectives rather than for the economy as a whole. Applied to individuals it indicates the extent to which an individual is independent of the reward of his current supply of personal services.⁶³ Applied to enterprises it measures, with appropriate variations of the numerator, the yield of total invested capital or of net worth. In economic accounting the ratio for sectors of the economy or all of it can be used also as an index of capital intensity.

6) The velocity of turnover of property, obtained by dividing the turnover of one type or a group of assets during a given period into the average value of the stock of the same assets, is a minor byproduct of national balance sheet calculations. It is of some interest in the analysis of the capital market and in the investigation of the saving and inheritance habits of the community.

7) A more important, but at the same time more controversial, use of national wealth figures is the derivation of indices of capital density, i.e., the amount of capital per head of the population or per employed person. Such figures are important in analyzing intertemporal, interspatial, or interindustrial differences of national income.⁶⁴ Because of the often far-reaching methodological differences between unadjusted national wealth figures derived from business accounting, such comparisons should be based exclusively on the adjusted and standardized figures of economic accounting.

8) For the skeptical statistician the chief merit of national

⁶² See especially Kuznets, 'On the Measurement of National Wealth', p. 49.

⁶³ An example of such an application is provided by the Australian census of 1915 (cf. G. H. Knibbs, *The Private Wealth of Australia and its Growth*, Melbourne, 1918; Part IV, Ch. I).

⁶⁴ For examples of such comparisons see Colin Clark, Ch. XI.

wealth estimates is probably that, if periodically made on a consistent basis, they are a check against the cumulated figures of saving or capital formation derived from statistics on national income and its components.⁶⁵ They can, however, be used for such a check only if both estimates are reduced to a common price basis.

9) The analysis of the rate of growth is probably one of the most interesting and promising uses to which national wealth figures can be put. Its calculation ordinarily entails combining national wealth estimates with data on capital formation taken from national income statistics, although for longer intervals comparison of successive national wealth estimates alone may suffice, provided the estimates are standardized at least with respect to prices and capitalization rates. Such rates of growth are of interest not only if calculated for entire countries but even on the less comprehensive basis of certain industries or regions within a country. Similar calculations for certain groups of individuals or enterprises or collectives within a country are of great sociological interest. Usually they will have to be based exclusively on successive wealth evaluations—in this case at market prices—since cumulated figures for savings, even if they were available in the necessary detail, would not reflect changes in the value of assets which may have a great influence on the differentials in the rate of growth of wealth as between groups.

10) A final use for national wealth figures that has recently acquired some importance is the comparison of war losses, or similar drafts on capital, and national wealth. In this field, unlike those of taxes, debt interest, and current reparations, in-

⁶⁵ Kuznets made such a comparison between cumulated capital formation and changes in national wealth in the United States, all in 1929 prices, for 1879-1938 (*National Product since 1869*, pp. 193-9): "the increase in the wealth items falls \$28 billion, or almost 20 percent, short of that indicated by net capital formation data; . . . this shortage is both absolutely and relatively greater for improvements than for durable equipment; . . . most of the shortage in improvements occurs during the decade 1912-22 . . ." In view of the inevitable crudeness of most of the figures such a difference—which is reduced by several adjustments to \$17 billion or about 12 percent—can hardly be regarded as significant or as a sure indication of the direction of the difference.

come figures cannot do the service of wealth figures. The severity of total war damages, or similar losses of tangible assets, can be assessed most straightforwardly by being compared with total national wealth after both have been put on a comparable price level.⁶⁶ While the ratio of postwar to prewar national income also indicates the effects of war damages, it is in no way identical with the loss ratio and is influenced, sometimes greatly, by factors such as the effects of war on the labor force and the degree of unemployment after and before the war. For the measurement of the effect of the war on specific types of assets the loss-wealth ratios are, of course, the sole device available. They are of interest not only as a descriptive device but also because they have been used to a considerable degree in international negotiations, particularly the settlement of reparations claims.⁶⁷

⁶⁶ On the use of national wealth figures in the measurement of the 'capital impact' of war expenditures see Goldsmith, 'Measuring the Economic Impact of Armament Expenditures', *Studies in Income and Wealth, Volume Six* (1943), pp. 62 ff.

⁶⁷ An example is the distribution of German reparations at the Paris Conference of 1945, one of the factors determining the quotas being the extent of war damages and their relation to national wealth. (Some of the pertinent figures used at the conference were published in *Bulletin d'Information et de Documentation*, National Bank of Belgium, March and April 1946.)

Uses of National Wealth Estimates
and the Structure of Claims

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A USES AND MISUSES OF ESTIMATES OF WEALTH AND CLAIMS

1 *The Swing toward Wealth Estimates*

A few years ago, national wealth estimates were in disrepute—largely because of a well grounded suspicion that the misuses of estimates of wealth and claims did more harm than their legitimate uses could outweigh. The long series of official national wealth estimates, running back to 1850, was not continued beyond 1922. National income estimates, which had barely started before World War I, became more and more fashionable through the 'twenties and 'thirties; and interest in them displaced interest in wealth.

The 1948 meeting of the Conference testified to a reverse swing. Wealth estimation is becoming more respectable and drawing more resources—primarily because we entered the postwar period with a backlog of needs for wealth estimates—needs that went largely unrecognized in the 1930's. These needs are genuine, and the upswing of wealth estimation is deserved. But our previous skepticism had good grounds; and if we forget those grounds for skepticism, much of our work is likely to go to waste.

2 *Misuses of Wealth and Claims Estimates*

Time was when wealth estimates were the crown of economic statistics. In the absence of income measurements, they offered the best yardstick against which to measure quantities. In a less urbanized society, moreover, people may have thought of their affairs more in terms of wealth than income. Wealth is a more natural focus of attention (and income less natural) for a farmer than for a wage earner.

These early uses for wealth estimates faded as society changed and as income figures became available. But the misuses went merrily on. Wealth estimates gave a certain concreteness to the superficial analogies between public and private affairs that make so much trouble in the social sciences. Notably, forebodings of 'national bankruptcy' were based upon

comparisons of wealth with national debt. A variation on the theme was comparison of wealth with 'total debt, public and private', or with 'liquid claims'. National wealth has figured also in the arguments of people eager to scuttle American help to Europe by blowing upon fears of the 'exhaustion of American resources'.

3 *The Backlog of Uses*

Meanwhile, we have discovered a long list of new uses for facts about national wealth and the claims upon it. The wartime accumulation of liquid assets and of 'backlogs of demand' has reminded us that we need to know how current operations of firms and households are influenced by the composition of their assets and liabilities. The gaps in our theories of investment force a search for dependable quantitative relationships linking investment with the stock of capital assets, the flow of output, and financial conditions. With rising interest in the public debt, it is not enough to throw epithets at people who say our debt threatens bankruptcy: economists have to produce down-to-earth explanations of the sense in which internal debt 'cancels out'—not ignoring the qualifications.

Applied economics thus bristles with questions for which we need information on wealth and claims. Speaking as a theorist, I hope that we are ready to correct the over-emphasis of interwar theories on flows by working out the interrelations of flows with stocks—a wealth problem.

4 *Mechanical vs. Motivating Relationships*

When we look at the relationship between the wealth-claims structure and the current flow of activity, we see two types of connection. These I shall call mechanical and motivating.

A mechanical relationship arises simply from the fact that many flows are in and out of stocks in any of several senses. To illustrate: (a) A firm's stock of machine parts has inflow from purchase and from its own fabrication; and outflow from sales, use in production, and wastage. *Net* inflow plus initial stock must equal final stock. (b) A firm's debts payable are increased

by new borrowing and interest accrual (inflow) and reduced by repayments (outflow); net new borrowing plus initial debt must equal final debt. (c) A firm's backlog of orders grows by the filing of new orders and shrinks by cancellation and delivery; net accretion of orders plus initial orders must equal orders on the books at the end of the period.

These mechanical relationships serve one set of uses for wealth data. That is, they give us control data for estimating income. We estimate a few items in the capital-formation accounts by an inventory method. In more (notably housing) we have fragmentary evidence on both inventories and flows; the two rather unreliable sets of data are then a check on each other.¹ Broadly speaking, to give this sort of check on commodity flow series we need the physical asset side of wealth estimation, with standards of valuation attuned to the problem of filtering out irrelevant price fluctuations. This sort of check on expenditure data gives us uses for the claims side. The materials assembled in this cluster of papers on wealth strike me as on the whole adapted to tracing these mechanical relationships.

The explanatory value of mechanical relationships, though, is only so-so. In principle, these relationships are characteristics of the definitions around which we build our accounting systems. They have the kind of explanatory value we attribute to the balance-of-payments equation in international trade: since they are truistical, any statement inconsistent with them must be false. This sort of truth is a rather useful weeding tool in the garden of economic doctrine. But it does not get us very far into the why of things.

Motivating relationships have explanatory value of a higher sort. They are stated in 'meaningful' propositions, not inevitable in the light of the definitions, and are susceptible to refutation if research shows the facts are not as pictured.² By the same

¹ A notable example of this sort of control operation is Simon Kuznets' comparison of capital formation with the accretion of capital wealth (*National Product since 1869*, pp. 193 ff.).

² Cf. Paul Samuelson, *Foundations of Economic Analysis* (Harvard University Press, 1947), pp. 3-5.

token, they are very interesting, if true, because of their prediction value. Examples of such interesting-if-true propositions involving wealth are: (a) firms in industry W will strive to increase inventory whenever it falls below x percent of sales; (b) the number of new housing units built has an elasticity of E_{nv} with respect to the vacancy ratio; (c) public utility concerns will refuse to borrow to expand their plant if their debt exceeds R times their operating revenue.

In short, the motivating relationships that need study lie in areas where we have to forecast, cannot forecast without a theory, and cannot theorize without factual data.

5 *Aggregates vs. Component Estimates*

The misuses of wealth estimates about which I complained above are misuses of 'global' figures. They arise when we are so rash as to publicize aggregate figures of wealth or debt.

The legitimate uses of wealth estimates depend upon the components of the wealth-and-claims structures and their interrelations. If we could fill in the master tables (Exhibits I and II) set up for this project—and now largely blank—the most useful figures would be those *inside*, in the cells. Uses for line totals and column totals would be few. As for the figure appearing in the southwest corner where line and column totals are added, it is there only to verify the arithmetic of the line and column additions; its logical force lies in the check-mark which certifies you get the same figure whether you add across or down, not in the figure itself.

The kind of 'structure' varies somewhat from use to use. For tracing mechanical relationships to control our income figures or fill gaps, type-of-asset classification is what we chiefly need. For the motivating relationships, though, we need type-of-holder (or type-of-debtor) classification. This classification has been and remains very thin—a testimonial to inadequate analysis of wealth in the past, and a handicap to its analysis in the future.

B THE STRUCTURE OF CLAIMS AND ECONOMIC MOTIVATION

1 *The Balance Sheet and Motives*

The starting point of the motivation approach to the wealth problem is the balance sheet of the individual firm or household, as it affects operations. The process of economic change is always throwing balance sheets out of equilibrium—giving people motives to take steps to change them. Balance sheets have low pressure areas into which they suck assets (newly created or bought from other economic units), as a shortage of size 15½ shirts on the shelves motivates department store buying. Balance sheets have high pressure areas from which they repel assets, as a household that has recently lost members has lost also incentives to buy new beds.

From the standpoint of the motivation problem, no classification of assets and liabilities is perfect. Liabilities must be regarded as held for the sake of holding assets—and as influencing asset structure. Assets may be held: (a) as operating assets, to help carry out the current operations of the economic unit (household outfit, industrial plant, goods in process, working inventory, shares in companies the owner has to control, etc.); (b) as a source of nonoperating income; (c) speculatively, in the hope of capital gain; (d) for liquidity. Note that identical assets may be differently classified by different people. For the C & O, New York Central stock is a channel for the exercise of power—an operating asset; for most holders, asset-holding motives (b) and (c) predominate. Holdings of spot wheat are an operating asset to a miller, a speculative asset to a Board of Trade member. A Treasury certificate is a source of income and of liquidity to a bank, primarily a source of liquidity to a corporation with accrued tax liabilities, but a speculative asset to the Discount Corporation.

The nearest thing to an all purpose classification of balance sheet items is probably by liquidity. Liabilities have *negative* liquidity, shading off from -1 (liquidity of cash = 1) for debts payable tomorrow to a lower coefficient for debts payable 20 years hence. Arrangement by maturity would do fair justice

to the liquidity of debts *if* we could allow properly for fictitious maturities—where renewal is in substance already provided for. On the asset side, items of high liquidity and negligible income (cash) are at one end of the spectrum; at the other end are assets that are firmly tied into the unit's income- or enjoyment-yielding activity (old clothes; parts of essential machinery). Other assets can be ranged on a scale along which liquidity drops and essentiality to the unit's operation rises. Broadly speaking, if any event increases a unit's liquidity (or reduces its need for liquidity) the result will be substitution along this scale. But the assets at the high-essentiality-low-liquidity end are largely the products of capital formation (buildings, machinery, etc.). So such a shift strengthens the market of durable goods producers.

Unfortunately, this is only one dimension of the classifications we might make. We might classify assets according to the stability of their prospective prices. Highly speculative assets may slide rather fast along the liquidity-essentiality scale as speculative attitudes shift. Or we might classify assets by their speed of attrition under some process we are studying (war, or depression, or obsolescence through technical progress). Assets that evaporate quickly are likely to become low pressure sectors of balance sheets and encourage new production.

Any way you look at this classification problem, it is plain that in principle we need to assemble data in the form of a cross tabulation table (such as Exhibit I)—showing assets and claims by type of *both* asset and holder (or debtor). Our inability to fill this table is an index of the thinness of our knowledge.

2 *Valuation Patterns*

From the standpoint of liquidity (or of monetary theory), the problem of motivating relationships among balance sheet items turns on current dollar valuations. Comparisons from time to time or from place to place, as far as I can visualize comparisons we may want, can be put in terms of comparisons of ratios, each ratio being a fraction in which the numerator and denominator are expressed in dollars of like date.

For operating assets, replacement cost is the most appro-

priate standard, for technological progress usually opens options of replacing with lower cost equipment of equal capacity, so that replacement of capacity rather than of physical attributes must be the yardstick.³ The reason is that for many analytical purposes we want to treat increments of operating assets as percentages of the stock, so that comparability of valuation between existing and new assets is essential. I venture the guess that the needs of the mechanical relations and motivating relations studies will run parallel.

For debts payable, a satisfactory first approximation is face value. Refinements of valuation lead to puzzles, however. For one thing, debts *receivable* are always (and properly) valued *ex* an allowance for losses. This implies that in a mechanical-relations study some corresponding subtraction should be made from debts payable. In a motivating-relations study, the situation is different. A debtor who sees default as *inevitable* is in a special situation: he has intense motives to 'milk' his enterprise, and if feasible such debtors should be treated as a special class. A debtor who sees default as *possible but undesirable* is in a very different situation: he may have incentives to 'plunge' speculatively if his default can be avoided only by some sort of spectacular success, or to be ultra-conservative if default can clearly be avoided by playing safe but may ensue if risks are run. Since most defaults are probably not taken into account far in advance in debtors' calculations, the rough and ready solution of taking debts payable at face value is probably not too bad. A second puzzle arises on the side of interest. If (say) a corporation has chosen to float bonds at a discount rather than offer a high coupon rate, discounting future repayments

³ Omission of values for human resources of households is not crucial, from the motivating relations standpoint, because *acquisition* of additions or replacements is not ordinarily a matter of business calculation in the household.

In thinking of intangible wealth attached to firms, however, human resources count—as far as *groupings* have been built up (or are to be built up) on which the efficiency of the firm depends. The superiority of a going concern over a mere heap of resources, blueprints, etc. lies in patterns of cooperation, and in specialized technical knowledge—acquired at a cost, reproducible at a cost, and recognized as real by the practice of insuring lives of key men for the benefit of the firm.

of principal and interest at an interest rate truly relevant to the firm's calculations will yield a present value of the debt below the face value. Owing to the prevalence of capital rationing,⁴ 'internal rates' of economic units probably rule a good deal higher than the rates formally embodied in debt contracts; and it may be argued that debts payable are overvalued on the books in consequence. On the other hand, book value as such must be granted a certain importance in business calculations.

For nonoperating assets, the student of motivating relationships has reason to be interested in market values, book values, and the spread between them; also (as far as these assets are debts receivable) in face value if different from book value. An asset whose market value exceeds its book value may be presumed to be a good deal more liquid in the eyes of its holder than an asset whose market value is less than its book value, especially if the market is below par.⁵ It must be remembered that those who decide to acquire, hold, or sell assets are operating largely with other people's money, and in consequence have reason to be less concerned with maximum gain for their clients and more concerned with adherence to convention and avoidance of actions likely to stir up criticism than those who operate with their own money. Public emphasis on market values in these cases tends to keep clients in a nervous state, as witness the relative situations of investment trusts and life insurance. Trustees have a special incentive to be conservative in selecting assets, and to choose the most stable basis of valuation for their formal accounting—and also for public explanations and private rationalizations of their policy (which in turn must have a significant influence on policy itself).

⁴ See A. G. Hart, *Anticipations, Uncertainty and Dynamic Planning* (University of Chicago Press, 1940), Ch. III.

⁵ On a 2.5 percent yield basis, a 3 percent bond selling at a premium is likely to be looked upon as much more liquid than a 2 percent bond selling at a discount. To sell the 2 percent bond at a discount commonly involves giving up hope of recovery and putting the seal upon a loss—a much more painful process than giving up hope of a larger premium on the 3 percent bond.

In important special cases, however, tax incentives may pull the other way. A security holder who has taxable capital gains in the current tax period may prefer to select for sale securities on which he can register losses.

3 *Grouping of Units*

Obviously there is no way to handle every economic unit separately. So we must group units in such a way that we can presume that their situations and their reaction patterns are somewhat homogeneous. But for the study of motivating relationships, we should think of ourselves as summarizing the balance sheets of comparable units, not as grouping the holders of comparable assets.

These considerations are reflected in the headings of Exhibit I. But the groupings there are internally so heterogeneous that our ability to interpret the group aggregates is much weakened. For example, our column 11 (households) should in principle be divided in each of several ways:

By terms of occupancy

- a) Tenants
- b) Owner-occupants with substantial mortgage
- c) Owner-occupants without substantial mortgage

By level of wealth or of income

- d) Richest 1 percent
- e) Rest of richest 5 percent
- f) Rest of richest 10 percent
- etc.

By type of income

- i) Entrepreneurial
- j) Self-employed professional
- k) Wage earners, unionized
- l) Wage earners, nonunionized, and clerical
- m) Salaried professional and administrative
- n) Primarily dependent on property income
- o) Retired
- p) N.e.c.

By type of property held

- q) Proprietors (11i + 11j)
- r) Nonentrepreneurial assets
 - i) Chiefly cash and insurance
 - ii) The above plus owned home

- iii) The above plus other real estate and/or stock-exchange securities
- iv) The above plus securities held with a view to controlling corporations

Within each group, while we are at it, it would be desirable to build up a picture not only of average positions but of the dispersion of positions. For instance, we might distribute number of economic units and amounts of assets with reference to certain crucial asset-to-operating or asset-to-liability ratios.

The above is utopian. But it is worth stressing how far from utopian is the classification of our Exhibits—which in turn is far beyond what we seem able to fill in. Recognizing only one class of credit institution in Exhibits I and II is in the interest of saving space; it does not reflect lack of hope that we can find data. In my illustrative claims tabulation below (Table 1), I have managed to split out four subgroups, and the figures are among the least flimsy in that table. But business subgroups in either Exhibits I and II or Table 1 are too heterogeneous to make much sense in motivation terms. The absence of a separate group of real estate concerns is the most dramatic symptom of this weakness.

As a gauge of the primitive state of our knowledge of wealth, consider Hicks' modest little Table V in *Social Framework of the American Economy*, (p. 134). Of its 18 entries, not including subtotals and totals, we could probably fill in 6 for the United States from the data pulled together for this volume—with, I presume, about a 10 percent margin of accuracy. I might be able to guess the rest within 25 percent, but I cannot guarantee it.

4 *Effects of Heterogeneity*

In the absence of evidence, it might seem natural to shrug off all this fuss about the structure of assets and claims versus the size of the mass of assets. Admitting that in principle we always learn something from additional detail, is the gain worth while in this case?

A presumption is easily established that important evidence

is thrown away in the process of 'consolidating' wealth accounts down to a national aggregate. This presumption rests on the logic of debt. On the average or in the aggregate there is no debt, for every debt is both a payable and a receivable, and must therefore cancel out in the consolidation process. But everyone knows that debt does not cancel out of people's thoughts about their wealth position; and it is hard to believe that debt cancels out as an influence on capital formation and on the course of prices.

The importance of getting down to fairly homogeneous groups may be illustrated by a very sketchy analysis of corporate debt figures from *Statistics of Income for 1940*. Consider first 'all corporations'—excluding those shown in 'finance' except for the real estate subgroup. Their short term debt position was roughly in balance. They had receivables of \$18.2 billion and payables (accounts payable plus notes etc. maturing within a year) of \$18.4 billion. Besides, they had about \$10.7 billion of cash. Thus one would infer that a drop in the price level would increase their liquidity (as is commonly argued in monetary discussions) by raising the 'real' value of their cash and leaving the 'real' value of their net short term debt position undisturbed. The general inference is that flexibility of price levels would have a stabilizing effect on activity, since a drop would increase investment incentives via this rise in corporate liquidity.⁶

When we go into details by industrial groups, though, this inference is shaken. Consider 'public utilities and transportation'. Here receivables added up to \$1.44 billion and payables due within one year to \$2.12 billion, implying net debtorship of \$0.68 billion. In addition, long term debt was so overshadowing (\$23.3 billion) that maturities beyond 1 year must be taken as a serious negative item in liquidity.⁷ Cash was only \$1.85 billion. Prospects of a gain in liquidity in this sector through

⁶ Figures for households show them in a position to gain liquidity also by a decline in the price level.

⁷ For the inclusive group of corporations delimited above, long term debt stood at \$42.0 billion, or only about 3.9 times cash, as compared with 12.6 times cash for utilities and transportation.

price decline were thus far from bright. But a large proportion of the investment opportunity one would hope greater liquidity would uncover lies in this field.

In the real estate sector, even more damage is done to the general inference. Receivables were \$0.94 billion, payables \$1.87 billion, cash \$0.41 billion. So debts payable within one year exceeded receivables *plus cash* by a margin of \$0.52 billion. Into the bargain, the shadow of long term debt was still deeper—nearly 22 times cash.⁸ Here is another large block of investment opportunities.

These figures suggest that quite possibly in a deflation the increase in liquidity is in one set of hands and the access to investment opportunity in another. This may make quite a difference to the theory of money and business fluctuations. But there is no use pursuing these theoretical inferences here. The point is that we have to look inside the structure of claims before we can get reliable evidence on the motivating relationships of the balance sheet to operations.

C THE UNSATISFACTORY STATE OF KNOWLEDGE ABOUT WEALTH

1 *The Blanks in the Tables*

In view of the amount of spade-work on wealth which this batch of papers embodies, it might be natural to feel we are well on the way to an adequate knowledge about wealth. But this examination of the claims side of the wealth picture, and of the motivating relationships, says that we have barely made a beginning.

As mentioned above, the blanks in our master tables tell the story. We have a lot of bits and pieces, but they do not add up well. If we drew only upon the evidence assembled for this meeting, we could not fill in the key balance sheet items for

⁸ The situation was slightly better for profitable real estate corporations, which showed cash of \$0.23 billion, receivables of \$0.39 billion, accounts payable of \$0.33 billion, and other debt maturing within the year of \$0.26 billion. Long term debt stood at about 13.3 times cash. But this is still not a picture of a group of corporations that stands to gain liquidity from a price decline.

more than one or two major groups. Obviously we cannot afford to identify this set of reports with the sum of professional knowledge. At some points various byproducts of Morris Copeland's moneyflows study will fill in;⁹ at others we can use evidence from Federal Reserve studies of liquid assets; at others evidence from the National Bureau financial research program. But even taking all this into account, I still assert the evidence does not add up.

2 *Weakness in the Theory of Assets*

Part of the responsibility for our sad state of ignorance comes home to my own field of economic theory. In theory as in factual research, the interwar period was one of growing preoccupation with economic flows to the neglect of the problems of stocks. It was high time we discovered the income effect, and its pervasiveness in all the lines of work theorists have lately taken up (except monopolistic competition, where it is perhaps underrated), shows that theorists are trying to make up for lost time. But now it is high time we discovered the balance sheet effect.

Some work has been done in this direction—notably by Marschak and Hicks, and on a plane closer to policy lately by Homer Jones.¹⁰ I hope I am making some contribution in a recent book on money.¹¹ But having tried last year to run a seminar in this field, and having been forced to prune back some of the more ambitious growths in the money book, I have the feeling that we theorists have not yet found the right way to set this knotty problem up so that we can get our axes into it.

⁹ His very illuminating paper below, which fills several gaps I complain of for a few recent years, was not available when this was drafted.

¹⁰ Jacob Marschak, 'Money and the Theory of Assets', *Econometrica*, Vol. 6 (1938), pp. 811-25; Makower and Marschak, 'Assets, Prices and Monetary Theory', *Economica* (New Series, V, 1938), pp. 261-88; J. R. Hicks, 'A Suggestion for Simplifying the Theory of Money', *Economica* (New Series, II, 1935), pp. 1-19; *Value and Capital* (Oxford University Press, 1939), passim; Homer Jones, 'Investment Prospects', *Journal of Finance*, Vol. 2 (1947), pp. 15-33.

¹¹ A. G. Hart, *Money, Debt and Economic Activity* (Prentice-Hall, 1948), Ch. VIII.

3 *Lack of Evidence on Motivation*

I venture the guess that much of our trouble in this field springs from trying to theorize without enough evidence how motives actually tie together. We have little systematic knowledge how business men and consumers frame their estimates of the future. We have little systematic knowledge what happens when there are strategic changes in business plans—who is called in conclave, what evidence is pulled together, what arguments are given weight.

The time is ripe for trying to assemble and systematize a lot of interview information on business and household decisions. There seem to be several exploratory studies going on, and procedures for getting this sort of information have improved greatly in the last decade or so. But it will clearly be some years before economic theory (and thus the terms of reference of factual inquiries) can get the full benefit of such studies.¹²

4 *Need for an Economic-Unit Focus*

Having just filed what amounts to a petition-in-bankruptcy on behalf of economic theory, I may be in a poor position to suggest redirection of research. Yet I think some rather elementary theoretical considerations can help us stumble forward.

The starting point of theoretical inquiry is the notion that economic events are things done on behalf of economic units (households and firms). The post-Marshallian reorganization of economic theory rests upon the insight that forces affecting private operations must act via the decision-making of these units. Thus we can never go wrong in taking these units as a focus of analysis.

The inference for wealth studies is that we need monographic treatment of the wealth position of various classes of economic units, and its role in their operations. For some areas (especially banking, life insurance, transportation, and manufacturing), we have prefabricated source book material that

¹² On this problem of evidence see my 'Liquidity and Investment', *American Economic Review*, Supplement, May 1949.

makes it fairly easy to build up a rough picture. At the other extreme, we have only fragmentary evidence on the wealth position of private households (especially on the dispersion of such positions), and on the position of unincorporated business. In both these fields there is room for exploratory studies devoted to piecing together this fragmentary evidence.¹⁸ Even more urgent, though, is the invention of ways to get certain key pieces of evidence to fill gaps.

If there is to be a fresh set of assignments on wealth under the Conference, I would like to urge that they should divide the field by type of economic unit rather than by type of asset, and aim to yield balance sheets for each main type such as we now have for agriculture and for banking. If the Conference decides to adjourn its wealth inquiries to more favorable times, I would like to urge that individual workers try to work on the weakest type of unit areas (households and unincorporated business) as a contribution to hastening those more favorable times.

D THE STRUCTURE OF CLAIMS

The information on national wealth assembled for this volume is designed primarily to yield an inventory of physical assets in the United States. An inventory of claims upon wealth is supposed to arise as a byproduct.

I have already voiced my protest against this way of looking at things. The central point is simply that our inquiry was not designed so that it could yield the desired byproduct, since it was organized by types of assets rather than by types of economic units holding the assets. According to forecast, our inquiry has in fact not yielded an inventory of claims. Specifically, only the papers of Copeland, Burroughs, Kosh, and Sammons provide figures in usable form that go beyond those

¹⁸ My experience ten years ago in working out *Debts and Recovery* (Twentieth Century Fund, 1938) convinced me that ingenuity applied to these fragments could do a good deal—and could focus the uncertainties on a few crucial questions of fact which might be approachable by field study techniques.

available in print, and Kosh's happen to be only for 1946—a year for which other data are still fragmentary. Any gesture at filling in the forms we optimistically called 'Exhibits' I and II would be quite futile.

Could a rough picture of the structure of claims be pieced together from outside sources? At some risk to my professional reputation, I have attempted a sketch (Table 1) of claims existing in 1939. Some of the figures have direct evidence behind them; others are strongly indicated by fairly rigorous procedures of subtraction and cross-comparison; some are rank guesses. The only merit I can claim for the table factually is that I have tried to avoid contradicting known facts. Analytically, it has the merit of showing what kind of thing we would know if we put resources into a well coordinated study of claims; this is its real justification.

1 *Transactor Groups*

In building a brick house without clay in this fashion, it is essential to keep the structure simple. So I have pared down the number of transactor groups to (or perhaps past) the irreducible minimum. Working from right to left in the headings of the table, I have recognized two groups of 'ultimate' holders of wealth. Households must obviously be included. But since the wealth of governments and of private collectives (universities; mutual associations in respect of their unapportioned surplus) is not allocated to specific households, they also have to appear as ultimates; here they are lumped together.¹⁴ If we included, besides claims, an inventory of the physical assets owned by each transactor group, the total of such assets directly owned by ultimates plus net claims owned by ultimates would be the total of national wealth. All other transactor groups are treated as 'intermediaries', through claims upon which physical assets are indirectly owned by ultimates.

¹⁴ By a useful if artificial convention I have treated mutual life insurance companies, mutual savings banks, and savings and loan associations as credit institutions but carried their equity over as an asset of a (fictitious) collective.

The intermediaries are split into two major groups. Credit institutions are organizations that deal almost entirely in debt claims—physical assets and equity claims being incidental. The main subgroups are banks and life insurance companies. 'Other private credit institutions' include savings and loan associations, brokers, installment finance houses, etc. (Insurance other than life is treated as 'business' in the narrower sense.) For clarity, government 'corporations and credit agencies' are split off and treated here; the government's debt claims against them and 'net proprietary interest' are carried over to government in the 'ultimates' column. (Taxes accrued but unpaid, etc. are treated as assets of 'governments and private collectives'.) The Federal Reserve is treated as a government credit agency.

The domestic business group is split only three ways—corporations, farms, and noncorporate enterprise. The 'rest of the world' is treated as a business subgroup; a case could be made for setting it up as a major group rather than a subgroup, but this would complicate the table.

The 'gross total' figures which ornament the top line and left columns are mere operators with little analytical significance of their own. The more significant totals are the 'net' figures at the bottom of the main sections of the table and the 'total ultimates' figures at the right.

2 *Table Layout*

The table is laid out in four parts—cash and short term debt claims, long term debt claims, equity claims, and net claims. In each, the column headings are for major and minor transactor groups. In each of the first three, the stub is also for transactor groups. Thus the table is a cross-tabulation (with 'stuffings' which measure amounts of claims in billions of current dollars).

This cross-tabulation form is intended to help crystallize the concept of 'structure' in claims. It emphasizes the two-ended nature of a claim, and shows balance sheets of individual transactor groups as line and column crosses in a claims matrix. It

is helpful also for the detective work involved in research. Since each claim has two ends, it can always be found on two balance sheets. Estimates from both can be compared and figures from one balance sheet adjusted by figures from the other. As long as we lack direct evidence on balance sheets of individuals, we are slaves to residual estimation for many key figures; and here the rigidity of the cross-tabulation aids in guessing shrewdly.

Once we have data, sorting out balance sheets for separate groups will be helpful for further analysis. Furthermore, in view of differing motivation patterns, evidence can often be better presented with somewhat diverging balance sheet forms. But for fact finding, standardized forms and a cross-tabulation are essential—their absence is one reason for our poor success on the claims side in this study.

3 *The Short Term Structure*

In the short term section of the table, two monetary accounts appear on the debtor stub, without corresponding spaces in the creditor heading. This gives monetary gold and silver stocks a chance to come into the national wealth; and of course it brings cash plus receivables out above payables. Gold certificates are taken as evidence of Federal Reserve ownership of gold rather than as Treasury debts; but 'Treasury currency' and Federal Reserve Notes are treated (line M2) as debts for the issuers.

In the business columns a substantial short term creditorship appears, owing chiefly to the inclusion of cash (lines M2 and C1) among receivables. Noncash receivables for business roughly canceled short term debts payable. For corporations n.e.c., short term payables were roughly \$29 billion and receivables \$30 billion. On the other hand, these figures (based on *Statistics of Income*, excluding banking, etc.) presumably overstate receivables relative to payables and to cash, because of transit items debtors have charged off from both payables and cash but creditors have not yet transferred from receivables to cash.

Credit institutions appear as substantial short term debtors

because virtually all their liabilities (deposits, insurance cash values, savings and loan redeemable shares) are short term, while bonds and mortgages loom large among their assets. Households also appear as heavy net creditors, but only in virtue of cash assets. Better accounting for accrued wages and salaries, etc. would add to their apparent receivables; but not enough to outweigh installment debts, etc.

4 *The Long Term Debt Structure*

In the long term section, the monetary debtor accounts are missing. Besides, the credit institutions appear only as creditors. Business and government show up as net debtors; households (thanks to their holdings of bonds) as net creditors.

Here even more than in the short term table we miss information on finer subgroups. Surely many households as of 1939 must have been net debtors on long term account because of mortgages. And as already noted, real estate and utility corporations were heavy net debtors (besides being smaller net debtors on short term). The transactor group classification is too coarse for much use.

5 *The Equity Structure*

Almost by definition, the equity structure has to be curiously tilted. As business and credit institutions are not self-owning, their equities end up in the ultimates columns. Almost all the equity claims of households of course arise in 'business'.

Here we are particularly at a loss for information on what Mr. Goldsmith calls the 'valuation difference'. In the debt accounts, our chief worry is about the creditor's reserves for bad debts; though there are interesting puzzles about fluctuations in the market value of bonds. But in the equity accounts the market value of stocks is of the essence. The table is based on book values of concerns valued (*Statistics of Income*, chiefly). We might well lay out another table in the same form and stuff its cells with valuation differences instead of book values. But where are we to go for data?

6 *Minimum Requirements of Wealth Estimates*

A calculation of the sort just outlined, somewhat refined, could serve the purpose of the Hicks-Campion table. A series of such jobs for individual years could be the basis for some interpretation. A claims table can probably be worked out annually from 1928 onward—with a moderate improvement of data beginning during the war. If a physical assets table to match could also be worked out annually, we could get some clue to the shift of economic motives resulting from the cumulative effect of transactions, and from (*beziehungsweise* reflected in) revaluations of assets and claims. Unfortunately, an annual series of physical assets data may be hard to get.

The amount of interpretation one can base on this sort of table, though, depends on further cross-classification to increase the number of transactor groups. This will involve a curious sort of cut-and-try in using the cross-tab, since the borders of the table can be cross-classified more finely than the stuffings, and some of the stuffings data are lumpy.

7 *Research Agenda for Claims*

If we aim to get an adequate analysis of national wealth, as I pointed out above, we need further research on the claims side. Here is a list of specific projects that need working:

Credit institutions. Compilation of credit institution balance sheets set up to fit national wealth accounts, annually, with special regard to who holds the other end of the claim string (so as to facilitate use of bank, insurance, etc. data to fill in balance sheets of other transactor groups). Differences between bank book value and value on the books at the other end of the string may prove measurable.

Corporations. A similar job for corporations by major groups, using *Statistics of Income* supplemented by SEC data, Standard Statistics estimates, market values of shares, etc. Utilities and credit institutions should be pulled out of the *Statistics of Income* compilations and figures from direct sources put back in. As a special problem, the interbusiness float needs analysis.

Table 1: Balance Sheet for the Economy. Illustrative Cross-tabulation of Claims, 1939
(billions of current dollars)

CAUTION: As may be seen from the lack of detailed annotation, the figures below are very suppositious; many, in fact, are rank guesses. In the preliminary version of this paper, it was thought best to present tables containing such suppositious figures rather than mere blank spaces surrounded by headings and stubs. It was intended to replace these figures with more solid estimates from the related papers; but the related papers failed to yield the needed data. Against the advice of several very competent critics, I have taken the responsibility of reproducing the suppositious figures (which at least illustrate the kinds of relationship the claims-structure embodies) rather than leave the tables blank or invest the enormous amount of work it would take to satisfy myself that each figure was the best estimate I could make for the magnitude it purports to represent. *Few of the individual figures are very good estimates, and none should be used out of the context provided by the others.*

HOLDERS OF ASSETS	GROSS TOTAL (TB+TG+TU) TG	BUSINESS					CREDIT INSTITUTIONS					GOVT.					ULTIMATES				
		Corp. n.e.c. B1	Farms B2		Non- corp. B3	Rest of world B4	Sub- total TB	Banks		Life insur- ance		Other priv. cred.	Govt. corp. Res.	Sub total C4	TC	Govts. & priv. collect.	House- holds U1	Sub- total U2	TU		
			C1	C2				C3	C4												
CASH AND SHORT TERM DEBT CLAIMS																					
DEBTORS																					
TG Gross total	188	46	4	11	3	64	34	1	2	11	48		11	65		76					
Monetary Accounts																					
M1 Gold & silver	19	0	0	0	0	0	0	0	0	15	15		4	0		4					
M2 Other money, net	0	1	1	1	*	3	1	*	*	-5	-4		-2	3		1					
TM Subtotal	19	1	1	1	*	3	1	*	*	10	11		2	3		5					
Business																					
B1 Corp. n.e.c.	29	19	*	3	*	22	5	*	*	1	6		1	*		1					
B2 Farms	3	1	0	*	*	1	2	*	*	*	2		*	*		*					
B3 Noncorp. n.e.c.	13	8	*	2	*	10	3	*	*	*	3		*	*		*					
B4 Rest of world	1	*	*	*	0	*	*	*	*	*	*		*	*		*					
TB Subtotal	46	28	*	5	*	33	10	*	*	1	11		1	1		2					
Credit Institutions																					
C1 Banks	61	13	3	4	3	23	0	1	*	*	1		4	33		37					
C2 Life insurance	23	2	*	*	*	2	*	0	*	*	*		0	21		21					
C3 Other priv. cred.	8	*	*	*	*	*	3	*	*	*	3		*	5		5					
C4 Govt. corp. & Fed. Res.	12	*	*	*	*	*	12	*	*	*	12		*	*		*					
TC Subtotal	104	15	3	4	3	25	15	1	*	*	16		4	59		63					
Ultimates																					
U1 Govts. & priv. collect.	5	1	*	*	*	1	2	*	*	*	2		*	2		2					
U2 Households	14	1	*	1	*	2	6	*	*	2	8		4	*		4					
TU Subtotal	19	2	*	1	*	3	8	*	*	2	10		4	2		6					
TNS Net short term creditorship	19	17	1	-2	2	18	-27	-22	-6	-1	-56		6	51		57					
provided by the others.																					

TG Gross total <i>Business</i>	125	6	LONG TERM DEBT CLAIMS										4	51	55
			*	*	*	6	33	21	5	5	5	64			
B1 Corp. n.e.c.	45	4	*	*	*	4	6	9	*	*	15		*	26	26
B2 Farms	7	*	*	*	*	*	1	1	*	3	5		*	2	2
B3 Noncorp. n.e.c.	5	*	*	*	*	*	3	2	*	*	5		*	*	*
B4 Rest of world	3	*	*	*	*	*	1	*	*	*	1		*	2	2
BT Subtotal	60	4	*	*	*	4	11	12	*	3	26		*	30	30
<i>Ultimates</i>															
U1 Govts & priv. collect.	41	1	*	*	*	*	16	6	*	*	22		2	16	18
U2 Households	24	1	*	*	*	1	6	3	5	2	16		2	5	7
TU Subtotal	65	2	*	*	*	2	22	9	5	2	38		4	21	25
TNL Net long term creditorship	0	-39	-7	-5	-3	-54	33	21	5	5	64		-37	27	-10

EQUITY CLAIMS (AT BOOK VALUE OF CONCERN VALUED)

CONCERNS VALUED TG Gross total <i>Business</i>	254	42	*	3	6	51	2	*	*	2	8	193	201
B1 Corp. n.e.c.	126	37	*	3	6	46	*	*	*	*	*	80	80
B2 Farms	44	*	0	*	*	*	*	*	*	*	*	44	44
B3 Noncorp. n.e.c.	60	*	*	0	*	*	*	*	*	*	*	60	60
B4 Rest of world	9	5	*	*	0	5	1	*	*	*	*	3	3
BT Subtotal	239	42	*	3	6	51	1	*	*	1	*	187	187
<i>Credit Institutions</i>													
C1 Banks	8	*	*	*	*	*	1	*	*	1	1	6	7
C2 Life insurance	2	*	*	*	*	*	*	*	*	*	2	*	2
C3 Other priv. cred.	1	*	*	*	*	*	*	*	*	*	1	*	1
C4 Govt. corp. & Fed. Res.	4	*	*	*	*	*	*	*	*	*	4	*	4
CT Subtotal	15	*	*	*	*	*	1	*	*	1	8	6	14
TNE Net equity	0	-84	-44	-57	-3	-188	-6	-2	-1	-4	8	193	201

NET CLAIMS (EQUITY AT BOOK VALUE OF CONCERN VALUED)

TNS Net short term creditorship TNL Net long term creditorship TNE Net equity TNC Net claims	19 0 0 19	17 -39 -84 -106	1 -7 -44 -50	-2 -5 -57 -64	2 -3 -3 -4	18 -54 -188 -224	27 33 -6 0	-22 21 -2 -3	-6 5 -1 -2	-1 5 -4 0	-56 64 -13 -5	6 -37 8 -23	51 27 193 271	57 -10 201 248

* Less than 500 million.

0: zero by convention.

Unincorporated Nonfarm Business. Shrewd guesses may be made from sample data at the National Bureau of Economic Research and Dun and Bradstreet.

Households, Trust Accounts, etc. While data are fragmentary, it would pay to array them and see how near they come to giving information (capitalized income tax data, trust account data, etc. are samples of the fragments).

A Note on Negotiable Claims:
Who Owns and Who Owes What

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THE EXPLORATORY STUDY OF MONEYFLOWS IN WHICH I have been engaged has been addressed in part to the question, who owns negotiable claims (including trade credit), and whose obligations do these claims represent? A byproduct of the attempt to answer this question is information that can contribute something to the objective that was the special concern of the 1948 meeting of the Income Conference: the development of a national balance sheet.

I shall first sketch briefly the nature of the money circuit measures developed, then deal specifically with the estimates that have to do with liquid and negotiable claims.

A THE MONEYFLOWS PROJECT

For the purpose of tracing moneyflows through the economy, the economy was divided into eleven sectors, and a financial statement specially designed to reveal moneyflows and loan-fund balances estimated for each sector. The period covered by the exploratory study and by these financial statements is 1936-42. The financial statements for the several sectors all conform to a standard pattern. They tell us who paid and who received how much on account of various types of transaction—payrolls, interest, etc. They tell us also who owned and who owed how much on account of various types of claim. A major objective was to relate money, credit, and the financial structure of our economy on the one hand and gross national product on the other.

The economy was divided into eleven sectors. The financial

- | | |
|--|-----------------------------------|
| I Households | VI State and local governments |
| II Farms | VII Banks and U.S. monetary funds |
| III Industrial corporations | VIII Life insurance companies |
| IV Business proprietors and partnerships et al | IX Other insurance carriers |
| V The federal government | X Security and realty firms et al |
| | XI The rest of the world |

statement for each sector, that is, for each group of transactors, is divided into two parts. Part One, the moneyflows account, shows receipts and expenditures on account of various types of transaction. A standard list of transaction types is used for all

eleven sectors. Total receipts from these thirteen types of transaction are called total ordinary receipts. Total expenditures in

TYPES OF TRANSACTION

1 Gross cash pay	8 Net payments for real estate transfers
2 Cash interest	9 Taxes collected
3 Cash dividends	10 Tax refunds
4 Net owner takeouts	11 Insurance premiums
5 Instalments to contractors	12 Insurance benefits
6 Gross rents	13 Public purpose payments
7 Customer moneyflows	

connection with these thirteen types of transaction are called total ordinary expenditures. When ordinary expenditures exceed ordinary receipts the balancing item in the moneyflows account is called net money obtained through financing. When ordinary receipts exceed ordinary expenditures the balancing item is called net money advanced or returned to others.

Part Two of the financial statement for each transactor group deals with negotiable claims and trade credit claims. These claims are referred to as loanfund balances. Claims owned (loanfunds receivable) include currency and deposits (claims against banks and U.S. monetary funds), loans and securities held, and trade receivables. In the case of banks and U.S. monetary funds there are two special additional types of claims owned, the monetary gold stock and the technical item known as Treasury currency, a major component of which is the monetary silver stock. The monetary gold stock is regarded as a demand claim held by a U.S. monetary fund upon the rest of the world.

The claims owed by the various transactor groups include trade payables and miscellaneous debts—bonds, notes, mortgages, and debentures. In the case of private corporations paid-in capital also is counted as a loanfund payable.¹

Accrual claims, notably insurance reserves, do not appear on the financial statements. The statements report facts on a moneyflows, not on an accrual, basis. The moneyflows basis is a cash basis for most items in the statements, a book-credit basis for purchases on open account.²

¹ Since the Exchange Stabilization Fund is treated as a part of the sector, banks and U.S. monetary funds, its paid-in capital also is treated as a loanfund payable.

² Contract construction work is on a contractor's billing basis.

The balancing item in Part One of each financial statement is, as I have indicated, either net money advanced or returned to others or net money obtained through financing. When a transactor advances funds to others his net claims on others increase or their net claims on him decrease. When a transactor obtains funds there is a converse change in his net claim position. Thus the balancing item for Part One of the statement can be computed from the changes in the claims one owns and in the claims one owes others.

The eleven financial statements constitute what may be called the basic information of the moneyflows study. But two other types of exhibit should be mentioned. One is a summary moneyflows account consisting of four items. Like the detailed

Gross national product expenditures	Net money obtained through financ-
Net receipts from other production	ing or net money advanced to
transactions	finance others
Net transfer payments or receipts	

moneyflows account, this four-item summary is a balancing account except for statistical discrepancies.

The other type of exhibit is a set of national accounts. Each national account is derived by recapping information from the eleven more detailed financial statements. Some of these accounts recap information pertaining to various types of transaction and some recap information pertaining to various types of claim. Thus there is a national account for customer moneyflows. It shows the receipts by each sector of the economy from its customers and the expenditures by each sector as a customer. This account and the other national accounts, apart from statistical discrepancies and apart from deviations from a uniform system of accounting, are all balancing accounts. It is the national accounts dealing with claims or loanfund balances that are our immediate concern.

B NATIONAL LOANFUND ACCOUNTS

In theory at least, every claim has a double aspect: it is an asset to and an obligation for someone. 'Loanfunds', as I shall use

the term, refer not to all claims but to a major subclass, what may be called negotiable and trade credit claims.

Because claims have a double aspect it would seem desirable so far as feasible to define loanfunds receivable and payable in such a way that what appears as an asset on the financial statement of one transactor shall appear as an obligation on the statement of another, and vice versa. It would seem desirable also to have a uniform method of classifying loanfunds receivable and payable so that a separate national account, a separate balance sheet, can be set up for each type of claim, each balance sheet detailing the assets held by the various claimant sectors and the obligations outstanding against the various obligor sectors. Thus our objective might be to estimate the following national balance sheets:

- a) Cash (currency and bank deposits)
- b) Book credit (trade receivables and payables)
- c) Bonds, notes, debentures, and mortgages
- d) Capital stock of private corporations
- e) The monetary gold and silver stocks

Now if such balance sheets are to be in a reasonably useful form, it must not be too difficult to relate them to established compilations of balance sheet data for the various sectors of the economy. But these established compilations necessarily reflect the diverse practices customary in the several sectors of the economy. Because the objective of tying in with established compilations and the objective of uniform procedures across the board conflict, a compromise must be struck.

The need to compromise has led to the following results. First, the loanfund balance sheets do not balance. In fact, the discrepancies are large. Second, the definitions of loanfunds receivable and payable do not articulate closely. There are some claims for which only one aspect appears in the loanfund balance sheets. Third, we have three accounts instead of five and the separation of even these three accounts is incomplete. The three accounts are ⁸:

⁸ The tables are numbered 28, 29, and 31 instead of 1, 2, and 3 because they are preprints of tables from the main report on the moneyflows study.

Table 28, Cash, Book Credit, and Gold

Table 29, Federal Obligations and Treasury Currency

Table 31, Other Loans and Securities

Only a few series in these tables are really firm. Among the firmest are the federal cash balance and total federal obligations held by the public. Most of the series relating to households, to business proprietors and partnerships et al, and to security and realty firms et al are somewhat shaky estimates. Other series occupy an intermediate position on the scale of dependability.

The three tables were devised to tie into the moneyflows accounts and the requirements for this purpose and for the purpose of a national balance sheet are different. Nonetheless, I think a reasonably good picture of the broad outlines of our negotiable claims (and trade credit) structure can be obtained from these three tables.

In interpreting the tables we need to specify what we mean by an obligor and by a claimant, or to use a more general term, what we mean by a transactor. In particular, for this type of balance sheet information it is essential to indicate to what extent the information is on a consolidated basis and to what extent it is on a combined basis. For example, if the federal Old-Age and Survivors Insurance fund owns \$9 billion worth of securities that are part of the federal gross direct debt, and if we treat the OASI fund and the general fund of the Treasury as separate transactors, these \$9 billion will appear in the national loanfund accounts. But if we treat the federal government as a single transactor, that is, present the balance sheet information for it on a consolidated basis, these \$9 billion will not appear; they will cancel out in the process of consolidation.

The moneyflows study treats each of the following sectors of the economy as a single transactor:

- a) The federal government (hence interfund claims such as federal government obligations held by the OASI fund are not shown).
- b) Banks and U.S. monetary funds (hence interbank borrow-

ing and Federal Reserve Bank paid-in capital are not shown).
c) The rest of the world (only the cumulative difference between foreign held or issued claims coming to the United States and U.S. held or issued claims going to the rest of the world is shown. This series is arbitrarily set at zero as of the end of 1935).

The question of the degree of consolidation employed in national claims exhibits is important also in connection with three of the other eight sectors of the economy—industrial corporations, security and realty firms et al, and state and local governments. With regard to the first two, the aim was (except for corporate reorganization) to treat as a separate transactor each corporation that filed a separate federal income tax return in 1939. With regard to the third sector the aim was to treat as a separate transactor, each state, each municipal corporation, and each other unit of local government recognized by the Census Bureau in its compilations.

In interpreting Tables 28, 29, and 31 it would have been helpful to include the full specifications of the methods, but that was impossible in the time at my disposal. They are given in Appendix A to the main report on the moneyflows study, now in preparation. A few are commented on briefly here.

First, the economy was divided into sectors on the basis of an industrial classification of owners or transactors (as distinguished from a classification of establishments). The grouping follows the standard classification as far as that is applicable.

Second, there are three main types of deviation from a uniform system of accounting:

- a) Method of valuation: there are significant differences between the value of a claim in its loanfund receivable and in its loanfund payable aspects.
- b) Method of classification: every moneyflow transaction appears on two sets of books: those of the paying transactor and of the recipient. A transaction may be classified differently on the two records; and sometimes a difference in classification may have the effect of making an identifiable loanfund balance change appear on one record and not on the other.
- c) Timing: the same transaction may be entered on one set of

TABLE 28

THE NATIONAL CURRENCY
(Millions of

	1935	1936	1937	1938
ASSETS, DECEMBER 31				
A Households	29,000	31,800	32,200	32,400
B Farms	1,600	1,900	1,900	1,900
C Industrial Corporations	8,500	8,900	8,100	9,000
D Business Proprietors and Partnerships et al	4,700	5,200	5,400	5,400
E The Federal Government	2,240	1,980	3,020	3,160
F State and Local Governments	3,300	3,500	3,400	3,700
G Life Insurance Companies	800	800	700	800
H Other Insurance Carriers	400	500	500	600
J Security and Realty Firms et al	1,800	1,900	1,800	1,900
K The Rest of the World	<u>1,000</u>	<u>1,300</u>	<u>1,500</u>	<u>1,900</u>
L All Transactors	53,400	57,700	58,400	60,700
LIABILITIES, DECEMBER 31				
M Banks and U. S. Monetary Funds	53,800	58,600	59,100	61,300
N Discrepancy (Balance Receivable)	-400	- 800	- 700	- 600

THE NATIONAL
(Millions of

	1935	1936	1937	1938
ASSETS, DECEMBER 31				
P Industrial Corporations	14,700	16,100	15,600	15,000
Q Business Proprietors and Partnerships et al	6,300	6,900	7,000	6,400
R The Federal Government	<u>0</u>	<u>20</u>	<u>20</u>	<u>20</u>
S All Transactors	20,900	23,100	22,700	21,400
LIABILITIES, DECEMBER 31				
T Households	2,600	3,100	3,400	3,400
U Farms	1,400	1,600	1,800	1,600
V Industrial Corporations	11,400	12,600	11,400	11,200
W Business Proprietors and Partnerships et al	5,000	5,500	5,900	4,800
X The Federal Government	80	80	80	100
Y Security and Realty Firms et al	<u>200</u>	<u>200</u>	<u>300</u>	<u>300</u>
Z All Transactors	20,800	23,100	22,800	21,400
a Discrepancy (Balance Receivable)	200	<u>1/</u>	- 200	<u>1/</u>

THE NATIONAL
(Millions of

	1935	1936	1937	1938
ASSETS, DECEMBER 31				
b Banks and U. S. Monetary Funds	10,100	11,300	12,800	14,500
LIABILITIES, DECEMBER 31				
c The Rest of the World	0	1,100	2,400	4,100
d Discrepancy (Balance Receivable)	10,100	10,100	10,300	10,400

COMPUTATION OF DISCREPANCY BETWEEN
(Millions of

	1935	1936	1937	1938
e Discrepancy (Net Loanfund Balance Receivable)	9,900	9,300	9,500	9,800
f Increment in Net Loanfund Balance Receivable . . .		- 600	200	300
VALUATION ADJUSTMENTS a/c BAD DEBTS				
g Households (Debts Forgiven)		500	500	500
h Industrial Corporations #		-500	-400	-300
i Business Proprietors and Partnerships et al #		<u>-200</u>	<u>-200</u>	<u>-200</u>
j All Transactors		-200	-100	<u>1/</u>
k Discrepancy (Money Advanced or Returned Less Money Obtained)		-500	400	300

Notes: Due to rounding, figures for various lines calculated by formulas given in the source column may differ slightly from the entries shown.
#Receivables recoveries and debts forgiven minus receivables write-offs.

AND DEPOSITS ACCOUNT

Dollars)

1939	1940	1941	1942	Source	
34,900	36,600	40,200	47,200	P&B-I-d	A
2,100	2,300	2,800	4,100	P&B-II-U	B
10,000	11,900	12,800	16,100	P&B-III-a	C
5,600	6,500	7,200	9,400	P&B-IV-a	D
2,580	2,020	3,660	10,680	P&B-V-b	E
3,600	4,000	4,400	4,600	P&B-VI-b	F
900	1,000	900	700	P&B-VIII-Y	G
700	900	900	800	P&B-IX-W	H
2,000	2,400	2,500	2,900	P&B-X-b	J
<u>3,100</u>	<u>3,900</u>	<u>3,500</u>	<u>3,800</u>	P&B-XI-X	K
65,600	71,600	79,000	100,300	Total A thru K	L
66,500	73,300	80,900	102,400	P&B-VII-b	M
- 900	-1,700	-1,900	-2,100	L minus M	N

BOOK CREDIT ACCOUNT

Dollars)

1939	1940	1941	1942		
16,200	17,800 ^{2/}	21,200 ^{2/}	22,600 ^{2/}	P&B-III-b	P
6,700	7,300	8,600	8,200	P&B-IV-b	Q
<u>40</u>	<u>400</u>	<u>400</u>	<u>1,360</u>	P&B-V-c	R
22,900	25,500	30,200	32,200	P + Q + R	S
3,600	3,900	4,200	3,200	P&B-I-h	T
1,500	1,700	1,700	1,500	P&B-II-W	U
12,200	12,800	14,400	14,800	P&B-III-f	V
5,200	5,300	6,300	5,900	P&B-IV-f	W
100	-80	780	4,100	P&B-V-f	X
<u>300</u>	<u>300</u>	<u>300</u>	<u>300</u>	P&B-X-f	Y
22,900	23,900	27,700	29,800	Total T thru Y	Z
100	1,600	2,500	2,400	S minus Z	a

GOLD ACCOUNT

Dollars)

1939	1940	1941	1942		
17,600	22,000	22,700	22,700	P&B-VII-W	b
7,100	11,200	11,800	11,600	P&B-XI-b	c
10,600	10,800	11,000	11,100	b minus c	d

MONEY OBTAINED AND MONEY ADVANCED

Dollars)

1939	1940	1941	1942		
9,700	10,700	11,500	11,400	N + a + d	e
- 100	1,000	800	- 100	Increment in e	f
500	500	500	500	P&B-I-n	g
-400	-300	-400	-300	IS 306 B	h
<u>-200</u>	<u>-300</u>	<u>-200</u>	<u>-200</u>	P&B-IV-k	i
-100	1/	-100	1/	g + h + i	j
1/	1,000	900	-100	f minus j	k

1/Lies between + \$50 million.

2/A substantial part of the item on line Q in Table 31, Government Advances and Prepayments, is properly a deduction from these receivables.

TABLE 29

THE FEDERAL

(Millions of

	1935	1936	1937	1938
ASSETS, DECEMBER 31				
A Households	9,300	9,800	10,400	10,000
B Industrial Corporations	1,800	1,700	1,700	1,600
C Business Proprietors and Partnerships et al	600	700	800	800
D State and Local Governments	200	300	300	300
E Banks and U. S. Monetary Funds	19,500	21,500	20,700	22,100
F Life Insurance Companies	2,600	3,700	4,400	4,800
G Other Insurance Carriers	600	800	900	1,000
H Security and Realty Firms et al	1,100	1,200	1,300	1,400
J The Rest of the World	0	0	0	0
K All Transactors	35,700	39,600	40,400	41,900
LIABILITIES, DECEMBER 31				
L Federal Government Debt Held by the Public	35,500	39,400	40,500	41,900
M Discrepancy (Balance Receivable)	300	200	- 100	- 100

THE TREASURY

(Millions of

	1935	1936	1937	1938
ASSETS, DECEMBER 31				
N Banks and U. S. Monetary Funds	2,500	2,500	2,600	2,800
P All Transactors	2,500	2,500	2,600	2,800

COMPUTATION OF DISCREPANCY BETWEEN MONEY

(Millions of

	1935	1936	1937	1938
Q Net Loanfund Balance Receivable Above Accts.	2,700	2,700	2,600	2,700
INCREMENT IN BALANCE RECEIVABLE				
R Above Accounts		1/	- 200	200
S Table 31		900	- 600	-1,200
T Total		900	- 700	-1,000
VALUATION ADJUSTMENT a/c LOANS AND SECURITIES (Chiefly Asset Write-Ups Minus Asset Write-Downs)				
U Industrial Corporations		- 100	- 100	- 900
V The Federal Government		- 50	1/	50
W Banks and U. S. Monetary Funds		100	- 100	- 200
X Life Insurance Companies		1/	- 100	- 100
Y Other Insurance Carriers		20	- 40	- 80
Z Security and Realty Firms et al		100	- 100	- 200
a All Transactors		100	- 500	-1,400
b Discrepancy (Money Advanced or Returned minus Money Obtained)		800	- 200	400

Notes: Due to rounding, figures for various lines calculated by formulas given in the source column may differ slightly from the entries shown.

OBLIGATIONS ACCOUNT

Dollars)

<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>	<u>Source</u>	
10,200	10,700	13,600	22,300	P&B-I-e	A
1,600	1,300	2,700	8,400	P&B-III-c	B
800	800	1,200	2,100	P&B-IV-c	C
300	400	500	800	P&B-VI-c	D
23,500	25,000	29,700	54,100	P&B-VII-X	E
5,300	5,800	6,800	9,400	P&B-VIII-Z	F
1,100	1,100	1,400	1,900	P&B-IX-X	G
1,400	1,400	1,800	3,300	P&B-X-c	H
<u>0</u>	<u>0</u>	<u>200</u>	<u>600</u>	P&B-XI-Y	J
44,100	46,400	57,900	102,900	A thru J	K
44,100	46,400	57,800	103,400	P&B-V-g	L
100	100	100	- 500	K minus L	M

CURRENCY ACCOUNT

Dollars)

<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>		
3,000	3,100	3,200	3,600	P&B-VII-Z	N
3,000	3,100	3,200	3,600	N above	P

ADVANCED AND MONEY OBTAINED FOR TABLES 29 AND 31

Dollars)

<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>		
3,000	3,100	3,300	3,200	M + P	Q
300	100	200	- 100	Increment in Q	R
- 300	- 200	300	- 200	Table 31, Line' a	S
100	- 100	500	- 300	R + S	T
- 200	- 100	1/	0	IC 306 F	U
- 700	300	- 150	- 200	P&B-V-k	V
- 100	- 100	1/	- 100	P&B-VII-g	W
- 100	- 100	- 100	1/	P&B-VIII-d	X
- 40	- 80	- 100	- 20	P&B-IX-b	Y
<u>- 100</u>	<u>- 200</u>	<u>- 100</u>	<u>- 100</u>	P&B-X-m	Z
-1,200	- 300	- 400	- 400	U thru Z	a
1,300	100	900	100	T minus a	b

1/Lies between + \$50 million.

TABLE 31

THE OTHER LOANS

(Millions of

	1935	1936	1937	1938
ASSETS, DECEMBER 31				
A Households	111,100	111,000	110,700	110,400
B Industrial Corporations	22,600	21,900	21,300	21,500
C Business Proprietors and Partnerships et al	2,200	2,200	2,300	2,300
D The Federal Government	12,000	11,180	10,860	10,880
E State and Local Governments	4,100	4,300	4,400	4,600
F Banks and U. S. Monetary Funds	29,400	31,300	31,300	30,300
G Life Insurance Companies	16,800	17,200	18,000	19,000
H Other Insurance Carriers	5,000	5,200	5,400	5,400
J Security and Realty Firms et al	47,000	46,300	45,900	46,200
K The Rest of the World	0	1,100	2,200	2,500
L All Transactors	250,200	251,600	252,300	253,100

THE OTHER DEBTS

(Millions of

	1935	1936	1937	1938
LIABILITIES, DECEMBER 31				
M Households	21,900	21,900	21,600	21,100
N Farms	8,700	8,400	8,400	8,700
Industrial Corporations:				
P Other Debt	38,600	38,600	39,700	40,100
Q Government Advances and Prepayments	0	0	0	0
R Business Proprietors and Partnerships et al	6,600	6,900	7,100	7,000
S State and Local Governments	19,500	19,600	19,600	19,800
T Security and Realty Firms et al	31,200	31,000	31,300	32,100
U All Transactors	126,500	126,300	127,800	128,800

THE CORPORATE PAID-IN

(Millions of

	1935	1936	1937	1938
LIABILITIES, DECEMBER 31				
V Industrial Corporations	66,400	66,600	66,400	67,500
W Banks and U. S. Monetary Funds	7,000	6,900	6,700	6,600
X Security and Realty Firms et al	36,600	37,400	37,500	37,400
Y All Transactors	110,000	110,800	110,600	111,500

COMPUTED INCREMENT IN LOANFUND BALANCE

(Millions of

	1935	1936	1937	1938
Z Net Loanfund Balance Receivable	13,600	14,500	13,900	12,800
a Increment in Balance Receivable		900	- 600	- 1,200

RECAP OF DISCREPANCIES

	1935	1936	1937	1938
b Money Advanced or Returned minus Money Obtained, Table 28		- 500	400	300
c Money Advanced or Returned minus Money Obtained, Tables 29 & 31		800	- 200	400
d Total, Money Advanced or Returned minus Money Obtained, Tables 28, 29 & 31		300	100	800

Note: Due to rounding, figures for various lines calculated by formulas given in the source column may differ slightly from the entries shown.

AND SECURITIES ACCOUNT

Dollars)

<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>	<u>Source</u>	
109,500	108,700	108,300	108,600	P&B-I-f	A
21,600	21,800	22,100	20,300	P&B-III-d	B
2,300	2,300	2,300	2,000	P&B-IV-d	C
10,680	10,840	11,320	10,900	P&B-V-d	D
4,700	4,700	4,800	4,700	P&B-VI-d	E
30,900	32,500	34,800	31,400	P&B-VII-Y	F
19,800	20,800	22,000	22,000	P&B-VIII-a	G
5,400	5,700	5,800	5,900	P&B-IX-Y	H
45,600	46,000	46,100	42,400	P&B-X-d	J
<u>3,500</u>	<u>5,200</u>	<u>4,900</u>	<u>4,300</u>	P&B-XI-Z	K
254,000	258,700	262,400	252,500	A thru K	L

PAYABLE ACCOUNT

Dollars)

<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>		
21,800	22,500	22,800	19,700	P&B-I-1	M
8,500	8,800	8,800	8,600	P&B-II-X	N
40,000	41,000	42,300	40,400	P&B-III-g	P
0	600 2/	800 2/	2,000 2/	P&B-III-1	Q
7,700	8,800	10,200	8,800	P&B-IV-g	R
20,100	20,200	20,000	19,200	P&B-VI-f	S
<u>31,800</u>	<u>33,000</u>	<u>33,800</u>	<u>31,000</u>	P&B-X-g	T
130,000	134,900	138,700	129,700	M thru T	U

CAPITAL ACCOUNT

Dollars)

<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>		
67,300	67,400	67,000	66,200	P&B-III-h	V
6,500	6,500	6,300	6,200	P&B-VII-c	W
<u>37,700</u>	<u>37,600</u>	<u>37,900</u>	<u>38,100</u>	P&B-X-h	X
111,500	111,500	111,200	110,400	V + W + X	Y

RECEIVABLE IN ABOVE ACCOUNTS

Dollars)

<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>		
12,500	12,300	12,500	12,300	L minus (U + Y)	Z
- 300	- 200	300	- 200	Increment in Z	a

IN TABLES 28, 29 AND 31

<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>		
<u>1/</u>	1,000	900	- 100	Table 28, line k	b
1,300	100	900	100	Table 29, line b	c
1,300	1,100	1,800	<u>1/</u>	b + c	d

1/ies between + \$50 million.

2/A substantial part of this item belongs in the national book credit account rather than in this account. See footnote 2/ to Table 28.

books during one year and on the other set during the following year.

In connection with Table 28 we note four deviations from accounting uniformity:

a) Practice with respect to methods of valuation for trade receivables and for payables differs markedly. Trade receivables are commonly reported net of a reserve for bad debts; trade payables are commonly reported gross. This difference in methods of valuation tends to make the receivables balance materially smaller than the payables balance.

b) When Transactor P makes a settlement of an account to Transactor R by mailing a check, he debits his trade payables account and credits his cash balance. The entry on R's books for this settlement, a debit to cash and a credit to trade receivables, is commonly made one or more days later. We may pass over the still later entries on the books of the banks, noting only that on the consolidated statement for banks and U.S. monetary funds the cash involved always appears as a deposit liability either to P or to R. But while the check is in the mail neither P nor R includes it in his cash balance. Thus because the entries made by the R's of our economy lag behind the entries made by the P's, the currency and deposit liabilities of banks and U.S. monetary funds always tend to be larger than the currency and deposit claims on banks and U.S. monetary funds as reported by other transactors. The amount of this excess is known as the mail float. Also, because the entries made by the R's lag behind those made by the P's, trade payables always tend to be smaller than trade receivables by the amount of the mail float.

So far as the relations between trade receivables and trade payables are concerned, these two deviations from accounting uniformity, the reserve for bad debts and the mail float, have effects that at least partly offset each other.

Because the mail float affects both the cash balances account and the book credit account, it seemed advisable to include these two types of claim in a single table.

c) During the war a somewhat novel type of book credit ac-

count became important. Particularly in the early war years the federal government made payments to public contractors in advance of deliveries. These prepayments involved a kind of negative 'accounts payable' for the federal government and a kind of negative 'accounts receivable' for public contractors. In computing accounts payable for the federal government (Table 28, line X), an allowance for these negative accounts payable was made. But the information for industrial corporations on negative 'accounts receivable' is combined with loans by the federal government under the caption 'government prepayments and advances'. This item appears in Table 31, line Q. Since a part of this item properly belongs in the book credit account in Table 28, the separation between Tables 28 and 31 is incomplete.

d) We regard the monetary gold stock as a demand claim on the rest of the world held by banks and U.S. monetary funds. Increments and decrements in this stock are due chiefly to gold imports and exports. But to a smaller extent we must take account of transactions inside our economy, principally of additions to the gold stock from domestic production. Such additions may be thought of as entered in the moneyflows accounts as follows:

On the books of banks and U.S. monetary funds, debit gold stock and credit currency and deposit liabilities;

On the books of the gold producer, debit cash balance and credit receipts from customers.

Because of this deviation from a uniform scheme of account classification in the case of the gold stock, claims held by banks and U.S. monetary funds and obligations of other transactors are not defined in precisely the same way. To the extent that the monetary gold stock has come from domestic production the loanfund accounts show a claim held to which there is no corresponding liability. In point of fact the discrepancy in the gold account is considerably larger than can be explained by this deviation from a uniform method of classification alone, because in computing the liability item for the rest of the world as shown in this account (cumulative net gold imports)

the level was arbitrarily set at zero as of the end of 1935 (see Table 28, line c). For purposes of the moneyflows study differences between the levels at which assets and obligations are valued are not in themselves of great consequence; for these purposes it is the changes during the year that count.

Before considering the computation of money advanced or obtained by various transactors in connection with the cash, book credit, and gold accounts let us take up the other two tables. The top section of Table 29 presents the federal obligations account. As already explained, only obligations in the hands of the public are included in this account. There is a slight difference between the liability item on line L and the total shown as assets of other transactors (line K). Two factors account for this small difference. First, while holdings of other transactors are on a book-value-for obligor basis, holder valuations were used in the case of banks and U.S. monetary funds, and these are not quite the same as the values according to government records. Second, among the items included in the federal gross debt are the non-interest bearing obligations for the retirement of United States notes, Federal Reserve Bank notes, and national bank notes. The counterpart of these obligations is included in 'Treasury currency', an item carried as an asset of banks and U.S. monetary funds. It is for this reason that we include Treasury currency in Table 29.

As already indicated, Treasury currency includes also the monetary silver stock. Since silver imports and exports are classified as ordinary receipts and expenditures for the rest of the world, and since additions to the monetary silver stock from domestic production represent ordinary receipts for industrial corporations, the monetary silver stock is a claim that has only an asset aspect; no corresponding obligation appears in Table 28, 29, or 31.⁴

Table 31 includes all bonds, notes, debentures, and mort-

⁴ The situation is somewhat more complicated than these statements indicate. A portion of the monetary silver stock is customarily treated in current statistics as part of the general fund balance of the Treasury but on the records of banks and U.S. monetary funds is not included in Treasury currency.

gages except federal obligations,⁵ and the paid-in capital of industrial corporations, banks and U.S. monetary funds, and incorporated security and realty firms et al. It is unfortunate, particularly for our present purpose, that the asset information in the moneyflows study was not divided to show the bonds, notes, debentures, and mortgages separately from the stock.

The desirability of such a separation in the loanfund asset information arises in part from the following considerations: The difference between the asset figures and the face value of bonds, notes, debentures, and mortgages is presumably relatively small. A fortiori year to year changes in the book value of such items are relatively small. On the other hand, there is a marked disparity in level between the asset valuations and the obligor valuations in the case of corporate stock, and even year to year changes in the book value of corporate stock held are presumably substantial. If we are to allow for deviations from a uniform method of valuation, we must be able to deal separately with holdings of corporate stock. We shall find these considerations intensified when we come to the problem of discrepancies in the method of valuation as between claims and tangible assets.

In Table 31 the assets listed as 'other loans and securities' (lines A through K) and the liabilities listed on lines M through X refer to approximately the same set of claims. The discrepancy shown on line Z is very largely due to valuation differences. And these differences arise chiefly in connection with stock. The amounts included for holdings of bonds, notes, debentures, and mortgages in line L presumably do not differ greatly from the liabilities total on line U. The outstanding obligations of private corporations on account of capital stock (lines V through X) are rough estimates of the value of paid-in capital. The asset figures reported in Table 31 are on a similar valuation basis for households but on a holder book value basis for most other sectors of the economy. Two of these other sectors—industrial corporations and security and realty firms et al—have very large holdings of stock. The holdings by security

⁵ This is not a complete list of types of other debts payable.

and realty firms et al are substantial because they include those of holding companies and investment trusts. The stock holdings included in lines C through H and in line K are small. The valuation discrepancy problem focuses on the relation between the valuation basis for stock used in lines V and X on the one hand and in lines B and J on the other.

As stated above, the balancing item in the financial statement for each transactor is the amount of money advanced or returned to others or the amount obtained through loanfund financing, and the amount of money so obtained or advanced can be computed from the changes in the loanfund balances. A transactor's net loanfund balance receivable increases when he advances or returns money to others and decreases when he obtains money through financing. However, changes in a transactor's net loanfund balance are not due exclusively to obtaining or advancing money. They may be due to changes in book value. In computing the money obtained or advanced from loanfund balance information it is therefore necessary first to compute the increment in the net loanfund balance, then to correct this increment so as to exclude the estimated influence of changes in book value.

If Tables 28, 29, and 31 were each a completely separate account and if we had adequate information on book revaluations, the amount of money advanced, returned, or obtained through each category of claims by all transactors would be zero. In other words, money obtained by one transactor is money advanced or returned by another, and money advanced or returned by one transactor is money obtained by another. Since the three accounts are not entirely separate, only two computations of the amount of money obtained or money advanced or returned have been made—one in Table 28 and one in Table 29. The latter is a combined computation for Tables 29 and 31. The amount of money advanced or returned, Table 28, line k, Table 29, line b, and the sum of these two lines, Table 31, line d, records the statistical discrepancy in the estimates of moneyflows due to loanfund transactions.

The three tables present the principal information in the

moneyflows study pertinent to the development of a national balance sheet. The only series that have as yet been brought down to date are those pertaining to banks and U.S. monetary funds. Information for recent dates and for several earlier dates for this sector will be found in the *Federal Reserve Bulletin*, January 1948.

Although the federal government is treated as a single transactor in the tables, the financial statement for it is a consolidation of five subsidiary statements.⁶ Three of these subsidiary statements are for social insurance funds. A significant aspect of our national balance sheet is brought out if we attempt to combine some of the information on these subsidiary statements and information available in connection with other sectors into an exhibit of claims that represent what may be called institutional savings. These claims are held mainly by or on behalf of households (Table 1).

Table 1
Institutional Savings Claims Held Mainly By or on Behalf
of Households
(billions of dollars; as of December 31, 1939)

A	Life insurance companies, policy reserves	25.8
B	Other insurance carriers (incl. fraternal orders & private pension funds), loans & securities	6.4
C	Federal social insurance funds, loans & securities	4.5
D	State and local government social insurance funds, loans and securities	2.0
E	Time deposits in banks & postal savings system held by individuals	24.1
F	Savings & loan associations, repurchasable shares	4.0
	Total	66.8

To some extent the loan and security holdings of other insurance carriers reflect obligations of an accrual nature to sectors of the economy other than households. In connection with Table 1 there is also a very slight qualification of a similar character applicable to life insurance company policy reserves. On the other hand it may be argued that some individual holdings of demand deposits should be counted as institutional savings. It seems safe to say that claims held by households that repre-

⁶ See *Technical Paper 5*, 'Concerning a New Federal Financial Statement' (NBER, 1947).

sent institutional savings amounted to at least \$65 billion at the end of 1939; currently they amount to well over \$100 billion.

Institutional savings have come to play a very substantial role in the equity structure of our economy and if our present practices with respect to such savings are continued, it will be enhanced.

C LOANFUNDS AND THE NATIONAL BALANCE SHEET

What place should the claims information considered above have in a national balance sheet, and what changes in this claims information would add to its usefulness for such a balance sheet purpose? As an initial step toward answering this question we may note that in confining our attention largely to negotiable and trade credit claims, we have slighted three chief types of claim: accrual claims, noncorporate proprietorship equities, and international titular claims.

If we use the word 'accrual' broadly we may say that in their asset aspect accrual claims include various deferred charges to income as well as items of accrued income receivable. And in their liability aspect they include both accrued expenses payable and deferred credits to income. Most categories of accrual claims are relatively small in relation to national wealth. The largest category of accrual claim is insurance policy reserves. The next largest is probably accrued taxes payable.

The second major category of claims we have slighted is the proprietorship or residual equities of unincorporated businesses. In the case of businesses organized in the sole proprietorship form the residual equity is a liability of the proprietor (in his business capacity) to himself (in his capacity as a householder).⁷

The items in the third class of slighted claims are, properly speaking, not claims at all. They are direct titles held in the

⁷ Although not in accord with preferred accounting usage, 'liability' is used for brevity in the sense in which it is widely used on balance sheets—it includes both debts and proprietorship equities.

United States (or held abroad) to tangible assets outside (or inside) the United States. They represent direct international ownership of wealth. But it is convenient to treat such titles exactly as we treat foreign bonds held here or domestic bonds held abroad.

In general we shall not here try to estimate most of the claims omitted from Tables 28, 29, and 31. We shall merely indicate where they fit into the picture in relation to the estimates for negotiable claims and trade credit claims.

It will help toward this objective if we attempt first a recapitulation—and in some respects an adjustment—of the negotiable claims figures for the end of 1939. Most of the figures in Table 2 will be found in Tables 28, 29, and 31. However, rough subdivisions of two economic sectors have been attempted. The advantage of these regroupings for purposes of a national balance sheet will appear shortly.

- a) Business proprietors and partnerships et al have been subdivided to show separately (i) business proprietors and partnerships including the professions and (ii) private nonprofit institutions; subdivision (i) has been combined with farms.
- b) Corporate security and realty firms et al have been segregated from noncorporate enterprises.

In addition to these regroupings several technical changes have been made for the purpose of eliminating certain deviations from accounting uniformity.

- 1) The part of Treasury currency that represents the monetary silver stock has been included in Table 2, column 1, as an asset of banks and U.S. monetary funds. The remainder of Treasury currency has been included with loans and securities in column 3.⁸
- 2) For the rest of the world, figures from Sammons' paper have been substituted for the figures on cumulative capital movement in Tables 29 and 31 (Table 2, col. 3, 6, and 7).

⁸ The monetary silver stock in Treasury currency does not include silver bullion in the General Fund of the Treasury; most, but not all, of the remainder of Treasury currency is treated by the Treasury Daily Statement as part of the federal noninterest-bearing direct debt.

Table 2
Summary of Liquid and Negotiable Claims Classified by Holders
(billions of dollars; as of December 31, 1939)

	Currency deposits (1)	Accounts re- ceivable (2)	Loans & securi- ties (3)	Total loanfunds receivable (4)	Accounts payable & monetary liabilities (5)	Other debts payable (6)	Paid-in capital (7)	Total loanfunds payable (8)	Net loanfunds receivable (9)
A Households	34.9	0	119.7	154.5	3.6	21.8	0	25.4	129.2
B Business proprietors & partner- ships (incl. farms & the pro- fessions)	6.8	6.7	.4	13.9	6.7	16.2	0	22.9	-9.0
C Nonprofit institutions	.9	0	2.7	3.6	0	0	0	0	3.6
D Industrial corporations	10.0	16.2	23.2	49.4	12.2	40.0	67.3	119.5	-70.1
E Federal government	2.6	*	10.6	13.2	.1	44.1	0	44.2	-31.0
F State & local govts.	3.6	0	5.0	8.6	0	20.1	0	20.1	-11.5
G Banks & U.S. monetary funds	19.9 ^a	0	55.1 ^c	75.0	66.5 ^d	0	6.5	73.0	2.0
H Private insur. carriers	1.6	0	31.5	33.1	0	0	0	0	33.1
I Security & realty firms et al:									
Corporate	1.2	0	37.2	38.4	.2	22.9 ^d	33.6 ^d	56.7	-18.3
Noncorporate	.8	0	9.8	10.6	.1	12.9	0	13.0	-2.4
K Rest of the world	3.1	0	8.3 ^b	11.9	17.6 ^a	8.5 ^b	3.7 ^d	29.8	-17.9
L All transactors	35.4	22.9	304.0	412.3	107.0	186.5	111.1	404.6	7.7

* Less than \$50 million.

^a Monetary gold stock plus silver dollars, silver bullion, and subsidiary silver included in Treasury currency.

^b From a preliminary draft of R. L. Sammons' paper, 'Foreign Investment Aspects of the Measurement of National Wealth'.

^c Includes the part of Treasury currency not included in col. 1.

^d Currency and deposit liabilities.

^e Gold stock.

^f Savings and loan association shares are included in col. 6, not in col. 7.

3) Savings and loan association shares have been transferred from column 7 to column 6 since they do not involve a valuation discrepancy problem.

4) The entry in column 5 for the rest of the world represents the entire monetary gold stock, not cumulative net imports.

Although these changes eliminate several sources of incomparability as between asset and liability totals, several types of deviation from accounting uniformity still remain. The most important are:

a) Valuation differences as between columns 2 and 5 due to the existence of reserves for bad debts.

b) Valuation differences as between the stock included in columns 3 and 7.

c) Similar but very much smaller valuation differences between other obligations included in columns 3 and 6. In what follows we shall for the sake of simplicity assume that these differences are so small we can afford to neglect them.

d) Minor technical differences (having to do with Treasury currency) between the assets in columns 1 and 3 and the liabilities in column 5, line G, and column 6, line E. We shall assume that (except for the silver question) we can afford to neglect these technical differences.

The discrepancies resulting from (a) and (b), especially (b), are major defects in Table 2 for purposes of developing a national balance sheet. Table 2 is deficient also in that accrual claims are omitted. To illustrate how Table 2 might be further adjusted so as to take accruals into account in the claims data we shall add rough figures for private insurance policy reserves. We shall omit various other accruals claims since figures for them are not conveniently at hand. I believe that in general to take them into account would not greatly alter the outlines of the financial structure picture. Social insurance reserves could of course be added and, as noted above, they are substantial. Many purposes, however, can be served by a balance sheet that does not take account of them. If one desires one may easily add them to the exhibit I shall shortly propose; house-

holds would be richer and governments poorer by the amount of the reserves.

The extent to which Table 2 falls short of providing the claims information needed for a national balance sheet depends upon the plan of the national balance sheet proposed. Our financial structure has come to be extremely complex, and there is, I think, the serious danger of attempting too complex a picture of it, a picture that would be too difficult to be grasped readily and could not be constructed with available information.

One direction of possible elaboration of the national balance sheet about which I am skeptical, except as a means of improving estimates or as a step in valuation adjustments, may be called the to-whom-from-whom type of claim exhibit—the attempt to provide a cross-classification of obligor and owner sectors for each type of claim, so that one can say how much any sector owes each other sector on account of any type of claim. Table 29 gives some of this kind of information. Table 2 does not go very far in this direction.

Even if we do not aim to present much to-whom-from-whom detail in a national balance sheet, it is urgent for us to distinguish debt claims (currency and deposits, gold, trade credit, bonds, notes, debentures, mortgages, internationally held direct titles to assets, and accruals) from corporate stock and the proprietorship equities of unincorporated enterprises. One reason for this as noted above, is that debt claims are not very differently valued in their asset and liability aspects. A further and stronger reason is that the values of debt claims are largely independent of the valuations placed on tangible assets. We can, therefore, attempt a net debt estimate for each sector of the economy. I propose that we regard sector net debt (or 'net credit') estimates as a major objective in any attempt to develop a national balance sheet.⁹

For purposes of a national balance sheet it seems to me we must distinguish three main types of transactor:

⁹ 'Net credit' is here to be understood to mean negative 'net debt'.

- 1) Unincorporated businesses. These transactors are mere intermediaries, so far as final ownership of national wealth is concerned. If we neglect their small holdings of stock, we can say that their proprietorship equities equal tangible assets minus net debt, and are claims held by households. Tangible assets plus claims held minus claims outstanding equal zero.
- 2) Business corporations. Corporations too are mere intermediaries in wealth ownership. Tangible assets plus claims held minus claims owed equal zero. But the claims of the corporate sectors involve special problems.
- 3) Final owners of wealth—households, governments, and private nonprofit institutions. For these transactors tangible assets plus claims held minus claims owed equal net wealth. The net wealth of an individual transactor may be either greater or less than zero. The total of net wealth for all domestic final owners equals the wealth owned in the United States. We may wish for some purposes to include the rest of the world as a final owner. When we do, total net wealth of final owners equals total tangible assets in the United States (plus intangibles if any allowance is made for them).¹⁰

In Table 2 we attempted to regroup transactors so as to separate out the three types just enumerated. The proprietorship equities of unincorporated enterprises present no special valuation problem. Once one has fixed the values of tangible assets, of debt claims, and of any stock they may hold, the valuation of the proprietorship equities of unincorporated businesses is a mere matter of computation by the formula stated above.

For three reasons corporate stock presents a special valuation problem in connection with a national balance sheet:

- 1) We must value stock consistently in its asset and in its liability aspects.
- 2) We must value the stock outstanding against any sector as a residual, i.e., as equal to tangible assets plus claims against others minus debt claims owed.

¹⁰ This parenthetical qualification is to be understood each time the term 'tangible assets' appears below.

3) Since stock is a residual equity that may be held by intermediary wealth owners, we must allow for the fact that the way we value the tangible assets of one sector will affect the stock valuation not only for that sector but also for other corporate sectors holding stock of that sector.

The first two of these propositions alone would not create a special problem. It is the combination of the three that does it.

Tables 3 and 4 are intended to indicate the nature of the problem. The figures are for illustrative purposes only; although based mainly on Table 2, they are extremely rough—they neglect various minor technical difficulties, and the adjustments are arbitrary.

I have raised a question as to how far we should go in the direction of to-whom-from-whom information. In dealing with stock, at least, a guess at this kind of detail is an essential step. Table 3 presents such a guess. The assumptions on which it rests are not an intrinsic part of my argument. If any one cares to go into them, they are indicated in the notes to the table. Column 1 gives crude estimates of the stock that was combined with other securities and loans in Table 2, column 3. These stock holdings are valued on one basis and the stock liabilities in line K, columns 3 through 8, are valued on another. Clearly one of these two sets of figures must be adjusted so as to put both on the same basis. Column 3 illustrates such an adjustment. The totals in column 3 are distributed by issuer in the remaining columns of Table 3.

In Table 4 I attempt to indicate how the claims information can be fitted into a national balance sheet. Various boxes for which no illustrative figures on tangible assets are here provided have X's in them in column 1. Each line on which an X is entered carries also a Y in column 5 or a Z in column 7. When tangible assets are treated as an unknown some other item in the sector balance sheet is an unknown also.

Column 2, net debt, was derived by adjusting the debt claims data from Table 2, columns 1, 2, 5, and 6, and the figures for other securities plus loans held from Table 3, column 2, to

Table 3

An Arbitrary Revaluation and Distribution of Stock Holdings (billions of dollars; as of December 31, 1939)

	Loans & Securities Held at Table 2 Values		Total, Col. 4-8	Stockholders Classified by Issuer				
	Stock (1)	Other sec. & loans (2)		Indust. corp. (4)	Banks & U.S. mon. funds (5)	Private insur. carriers (6)	Corp. sec. & realty firms et al (7)	Rest of the world (8)
A Households	69.7	50.0	69.7	31.4	3.7	1.0	33.6	0
B Nonprofit institutions	1.4	1.3	1.4	0	0	0	0	0
C Industrial corporations	12.8	10.4	11.0	9.1	0	0	0	1.9
D Fed., state, & local govts.	2.8	12.8	2.8	0	2.8	0	0	0
E Banks & U.S. monetary funds	.3	54.8	.2	2	0	0	0	0
F Private insur. carriers	2.1	29.4	1.8	1.8	0	0	0	0
G Security & realty firms et al:								
Corporate	22.4	14.6	19.2	17.4	0	0	0	1.8
Noncorporate	.3	9.7	.3	.3	0	0	0	0
H Business proprietors & partnerships	0	.4	0	0	0	0	0	0
I Rest of the world	5.7	3.1	5.7	5.7	0	0	0	0
J All holders	117.5	186.5	112.1	67.3	6.5	1.0	33.6	3.7

Line K (except col. 1 and 2) is from Table 2, col. 7. \$1 billion was added for private insurance carriers.

Col. 1 plus col. 2 equals Table 2, col. 3.

Entries in col. 1, lines A, B, D, E, F, and J are crude direct estimates. Entries in col. 2 on these lines are residual estimates.

The total in col. 2 equals the total in Table 2, col. 6. The residual was prorated to lines C, G, and H on rough estimates of interest income. Entries in col. 1 on these three lines are residual estimates.

It is arbitrarily assumed that all stock issued by private insurance carriers and security and realty firms et al is held by households, that the federal government owns only stock of banks and U.S. monetary funds, and that the remaining stock issued by banks and U.S. monetary funds is held by households.

Col. 3 is col. 1 with the discrepancy (112.1 minus 117.5) prorated in col. 1 for industrial corporations, banks and U.S. monetary funds, insurance carriers, and corporate security and realty firms et al.

Holdings of foreign stock are assumed to be divided equally between industrial corporations and corporate security and realty firms et al. All remaining entries are residuals.

Table 4
An Outline of a National Balance Sheet Based on Table 2 and an Adjusted Table 3
(billions of dollars; as of December 31, 1939)

	TANGIBLE ASSETS (1)	NET DEBT (2)	CAPITAL STOCK Outstanding (3)	Held (4)	NONCORPORATE PROPRIETORSHIPS Liabilities (5)	Assets (6)	NET WEALTH (7)
A Households	X ₁	-89.5	0	92.0	0	Y ₁ + Y ₂	Z ₁
B Business proprietors & partnerships	X ₂	8.8	0	0	Y ₁ = X ₂ - 8.8	0	0
C Nonprofit institutions	X ₃	-2.2	0	2.1	0	0	Z ₂
D Industrial corporations	97.0	14.2	97.9	15.1	0	0	0
E Fed., state, & local govts.	X ₄	45.2	0	2.8	0	0	Z ₃
F Banks & U.S. monetary funds	3.5	-6.2	10.0	.3	0	0	0
G Private insurance carriers	.5	1.0	2.1	2.6	0	0	0
H Security & realty firms et al:							
Corporate	16.0	6.1	37.0	27.1	0	0	0
Noncorporate	X ₅	2.7	0	.4	Y ₂ = X ₅ - 2.3	0	0
I Rest of the world	X ₆	19.9	3.7	8.3	0	0	Z ₄
J All transactors	X ₇	0	150.7	150.7	Y ₂	Y ₂	Z ₅

Col. 2 equals (Table 2, col. 5, plus Table 2, col. 6) minus (Table 2, col. 1, plus Table 3, col. 2, plus 1.025 times Table 2, col. 2) plus the following adjustments: line G + \$32 billion, line A minus \$30 billion, line D minus \$1 billion, and line H minus \$1 billion a/c private carrier life insurance policy reserves; line F + \$2 billion a/c silver (see the next note).

Col. 1, line F, includes \$2 billion of silver. Other tangible asset figures are based on *Statistics of Income, 1939*, Part 2.

Stock entries in col. 3 and 4 are from Table 3, col. 4 through 8, adjusted as follows: Table 3, col. 4, was increased 45.5 percent. Other figures were changed accordingly in conformity with the condition imposed: that col. 1 plus col. 4 equal col. 2 plus col. 3. This fixes col. 3 as a residual for lines D, F, G, and H, and fixes col. 5 as a residual for lines B and J. No change was made in Table 3, col. 7.

Col. 7 is the sum of the assets (col. 1, 4, and 6) minus the sum of the liabilities (col. 2, 3, and 5) for all lines.

eliminate various deviations from accounting uniformity. Three adjustments were made:

- 1) \$2 billion of silver was included as a tangible asset in column 1, line F, instead of being treated as a claim held.
- 2) Accounts receivable was increased 2.5 percent on account of bad debt reserves.
- 3) Rough figures for private insurance carrier policy reserves were added to the liabilities on line G and to the holdings on lines A, D, and H.

When there are no deviations from accounting uniformity we can expect the down-total of Table 4, column 2, to be zero. The net debt picture presented by column 2 is incomplete in that it does not take account of accrual claims other than private insurance carrier policy reserves and of internationally held direct titles to tangible assets. Even the incomplete picture is very rough.

Once valuations have been fixed for columns 1 and 2 we can derive the valuations for the other columns. The information needed for these derivations is that given in Table 3 together with the following equations:

For private corporations (intermediaries), $\text{col. 1} + \text{col. 4} = \text{col. 2} + \text{col. 3}$.

For unincorporated businesses (intermediaries), $\text{col. 1} + \text{col. 4} = \text{col. 2} + \text{col. 5}$.

For other sectors (final owners), $\text{col. 1} + \text{col. 4} + \text{col. 6} - \text{col. 2} = \text{col. 7}$.

Since, as Table 3 tells us, the stock that is a liability for industrial corporations is an asset for several sectors including industrial corporations, we must fix its value first. We do this by imposing the condition that the sum of columns 1 and 4 equal that of columns 2 and 3. The figures in Table 3, column 4, represent a paid-in capital valuation, excluding earned corporate surplus. The figures in Table 4, column 1, represent asset book values. To make the sums of columns 1 and 4 and of 2 and 3 equal on line D we raised each figure in Table 3, column 4, 45.5%.

This step fixes the value of stock holdings for several other

sectors including corporate security and realty firms et al. We can, therefore, now apply the column 1 plus 4 equals column 2 plus 3 formula to determine the entry in line H, column 3, and the other entries in column 3 of Table 4 until we have completed what amounts to an adjusted Table 3. Since the down-total of Table 4, column 3, is the down-total of column 3 of the adjusted Table 3, and since the down-total of Table 4, column 4, is the cross-total of the adjusted Table 3, line K, the two are equal.

In the case of unincorporated enterprises we now impose the condition that the sum of columns 1 and 4 equal that of columns 2 and 5. We can thus determine column 5 as a residual, since the values for columns 1, 2, and 4 are fixed. The down-total of column 5 equals the down-total of column 6, the only sector entry in column 6 being on line A.

For all holders of wealth who are mere intermediaries, the entries in column 7 are zero. For the other entries in column 7 we have the following formulas:

$$Z_1 = X_1 + Y_1 + Y_2 + 181.5$$

where 181.5 is stock held minus net debt, or 92.0 minus (minus 89.5);

$$Z_2 = X_3 + 4.3$$

$$Z_3 = X_4 \text{ minus } 42.4$$

$$Z_4 = X_6 \text{ minus } 15.3$$

$$Z_5 = Z_1 + Z_2 + Z_3 + Z_4 = X_7$$

Thus Z_5 represents the total wealth in the United States. If we wish the total wealth owned in the United States we must take (Z_5 minus Z_4) or ($Z_5 + 15.3$ minus X_6).

D CONCLUSIONS

The moneyflows study focuses on moneyflows. The claims estimates presented in it are in a sense a byproduct; they are confined to what we call negotiable claims and trade credit claims. Accrual items, proprietorship equities of unincorporated busi-

nesses, and internationally held direct titles to tangibles are not included.

For purposes of a national balance sheet there is a fundamental distinction between what may be called debt claims and proprietorship claims or residual equities. Debt claims may be defined as claims that can be evaluated independently of the methods adopted for tangible assets. The segregation of debt claims from proprietorship claims is incomplete in Tables 28, 29, and 31, but a rough illustrative segregation is offered.

For debt claims the problems due to deviations from accounting uniformity, though by no means easy, are less formidable than the corresponding problems with respect to corporate stock. A major objective should be to provide a national account of each clean-cut major category of debt claims covering all transactors, an account corrected for deviations from accounting uniformity. I suggest as a general rule applicable to most categories of debt claims that the governing method of valuation should be that employed on the books of the obligor. Each such national debt claims account should, apart from statistical discrepancies, be a balancing account.

I have said that for purposes of a national balance sheet the distinction between debt claims and residual equities is fundamental. For moneyflow accounts this distinction is helpful but hardly fundamental; the basic question is, what exchanges took place during the period under consideration and what moneyflows did these exchanges involve? This question applies to both stocks and bonds, notes, etc. and we can answer it for stocks as well as for bonds without reference to tangible asset values.

For purposes of a national balance sheet the basic valuation question refers not to the claims that changed hands during a given period but to all claims outstanding on a given date. Unless we set up a valuation difference account as Goldsmith has proposed,¹¹ this question can be answered for stocks—and for the residual equities of unincorporated businesses—only after valuations of tangible assets and of debts have been fixed

¹¹ 'Measuring National Wealth in a System of Social Accounting', above.

and only in the light of these valuations. Residual equities are necessarily valued as residuals, no matter what basis of tangible asset valuation we adopt; i.e., regardless whether our tangible asset valuation formula runs in terms of an imputed capitalization, of historical cost minus depreciation, or of market value.

We have illustrated the nature of the residual equity valuation problem, including the way in which it is complicated by the fact that some kinds of residual equities may be held by transactors who as wealth owners are mere intermediaries. In illustrating this complication, however, we indulged in oversimplification. I shall attempt to indicate only one of the respects in which a real attempt at a national balance would necessarily be more complicated. Our first step in residual value computations was to revalue the stock of industrial corporations held by various sectors; we applied a uniform percentage write-up to all the entries in column 3 of Table 3. In doing this we were in effect treating the stock of industrial corporations as if it consisted of the homogeneous shares of a single stock issue. A more refined procedure is clearly called for.

The statement of this assumption suggests two directions in which refinement of the residual computations should proceed. First, the category, stock of industrial corporations, should be detailed into various industrial subcategories, railroads, utilities, etc., and a separate residual computation made for each subcategory. Second, if possible, one or more categories of preferred stock should be separated out and treated as if they were what we have called debt claims, i.e., claims that can be valued independently of the methods adopted for tangible assets. If we proceed along these lines toward an exhibit of the type outlined in Table 4 I think we shall be attempting a feasible task and one that promises a widely useful form of national balance sheet.

Comment

Martin Bronfenbrenner

Mr. Goldsmith's excellent paper is the best introduction I know to the basic issues involved in national wealth statistics. In many parts, it is itself so much a summary of the present state of the debate as to make further summary largely a work of supererogation.

Mr. Goldsmith is an optimist on what I consider the five basic issues of national wealth estimation. I hope subsequent studies will bear him out on all five. My theoretical doubts, however, will become obvious in the course of this discussion.

1) Mr. Goldsmith is an optimist, first of all, in giving a clear operational meaning to the concept of national wealth. By 'clear' I do not mean exactly 'unequivocal'. What I mean rather is that Mr. Goldsmith has faith in the ultimate quantitative convergence of the various concepts involved.

Three such concepts are: first and broadest, the hedonic, which includes, in Kuznets' words, "the sources of events for which the aggregate of individuals who comprise a nation are willing to make sacrifices"; second and narrowest, the material, which limits the concepts to physical, tangible, and sometimes only reproducible assets; third and intermediate, the accounting concept, which builds up the totals by combining and consolidating actual and estimated balance sheets constructed in accordance with current accounting theory and practice. In his paper Mr. Goldsmith himself works entirely with the third concept.

2) Mr. Goldsmith is an optimist, secondly, in believing that national wealth can be made a welfare concept at the same time that it is an accounting total, a measure of productive capacity, and a useful adjunct in studying the structure of claims or of moneyflows. I suppose we all agree that there is some kind of positive correlation, significantly larger than zero, between national wealth and economic welfare. Mr. Goldsmith goes much further. I interpret him as maintaining that the correlation can be made very high indeed—let me ascribe to him the

figure .90, purely for illustrative purposes—and holding furthermore that it is worth while making sacrifices of speed, verifiability, and perhaps comparability in framing our concept of wealth so as to raise the correlation by a point or two.

3) Mr. Goldsmith is an optimist, thirdly, in anticipating the day when national wealth and income statistics can be based on what he calls *economic* as distinguished from *business* accounting. As concerns wealth, the distinction requires the elimination of values uncorrelated or negatively correlated with economic welfare—primarily capitalized monopoly gains. Mr. Goldsmith aims also at evaluating all reproducible assets at the marginal social money cost of their physical reproduction. Patents, trade-marks, 'good-will', 'going concern value', etc. would be eliminated. Such social costs as smoke and illness would be borne. Economic accounting in Mr. Goldsmith's sense involves also capitalization by 'pure' discount rates which have not been loaded with risk and uncertainty premia or, I should suppose, with appreciation factors designed as inflation hedges. Although he has seen the vision, Mr. Goldsmith is perfectly aware of all the difficulties in the way of a reliable system of national economic accounting, and he does not expect that even a national accounting income statement will be set up before this paper is published! But he has the faith that moves mountains. If faith can move mountains, can it not adjust a few statistical series?

4) Mr. Goldsmith is an optimist, fourthly, in seeking to link the national wealth and income accounts together by a formula I think we can translate into the terminology of the Department of Commerce series:

$$(\text{National Wealth})_2 = (\text{National Wealth})_1 + (\text{National Income})_2 - (\text{Personal Income})_2$$

Such an equality would be a useful enough cross-check on the consistency of the various statistical assumptions made in wealth and income estimates. For it to be valid, there are three requisites: National wealth must be computed as of the end of each period, and all personal income must be assumed to con-

sist of direct services or highly perishable goods. (As far as durable assets are included in personal consumption, it holds only asymptotically for periods long enough to permit most durable consumption goods to be treated as perishable.) Second, national wealth must be deflated by an acceptable price index. Third, the discovery and depletion of natural resources must be treated symmetrically in wealth and income accounts. If newly discovered values are added to national wealth accounts, they must likewise be added to national income accounts. The same rule holds in the case of omission, and converses can be set up to cover the depletion case. Many current proposals regarding national balance sheets would add discoveries and deduct depletions, while both are ignored on income statements. Under these proposals, the equation would not hold.

5) Mr. Goldsmith is an optimist, finally, in believing that, despite relative price and interest rate differences, national wealth figures can be made comparable—again, with perhaps a 90 percent correlation—between all nations that employ standard accounting techniques and do not include human capital as wealth. He makes a particular point of including the USSR, where capitalization ratios are allegedly somewhat arbitrary, so that the assets producing a given income stream may be valued at any figure over a wide range and without too close a relation to either production or reproduction costs.

I do not agree with all these viewpoints, stimulatingly and provocatively outlined as they are by Mr. Goldsmith. Aside from dividing economic units into 'ultimates' and 'intermediaries', and assets into 'physical assets' and 'claims', Mr. Goldsmith's skeletal framework avoids many basic issues of classification. Measures of liquidity position and moneyflows suggest classifications of the types presented by Hart and Copeland. The basic accounting framework, however, remains approximately the same.

On the technical side, the discussion accompanying Mr. Goldsmith's basic tables seemed unduly brief. I became quite confused in attempting to follow these tables, and have not

succeeded in reconciliations at all points. Trouble was encountered on three problems especially:

- 1) Is item II 6, equity securities owned by intermediaries, to be entered in the national balance sheets at market or book value?
- 2) Items II 9 and 15 are each labeled 'valuation difference'. Which purports to revalue the assets of *all* intermediaries and which to revalue only assets held by one or another category of economic subjects?
- 3) If in Table 1, Section A (pertaining to ultimate economic units) balances, and Section B (pertaining to intermediaries) does not, how can Section C, their sum (pertaining to the nation as a whole), balance?

To me at least, it would seem logical to enter item II 6 at market value, consistently with item I 6. In this event, item II 15 would become the valuation difference on *all* assets. Item II 9 would become the valuation difference on the assets held by *ultimate units only*. The section would balance as it stands, with items II 1 through 9 equaling items II 10 through 15. This solution would modify the fifth and sixth equations in the second group of Mr. Goldsmith's identities in Table 2, while validating the second identity.

Another solution, to enter item II 6 at book value, would confirm Mr. Goldsmith's fifth equation. Item II 9 would then become the valuation difference on assets held by *intermediate* economic units, item II 15 remaining as in the preceding paragraph. A balance is struck once more, but the sixth and second of Mr. Goldsmith's second family of equations in Table 2 must be modified.

A third solution might be to add a separate valuation difference equation as I 15 on the right side of Table 1. This would of course make Sections I and II completely symmetrical, since II 9 could be eliminated. Were this solution adopted, numerous minor changes would be required in the first two sections of Table 2, but the entire structure might be more readily comprehensible.

The status of money also raises technical problems under

Mr. Goldsmith's schema. As I understand his procedure, all domestic money is to be classified on the asset side as a claim, and on the liability side as a special sort of government or bank liability. It is cancelled out in the combination-consolidation process, which entails the liquidation of all claims.

This expedient impinges to some extent on recent economic theories about money, which ascribe to money the capacity of rendering a service (the provision of liquidity) quite independent of the goods it can buy. These theories appear to entitle cash balances to a role in the total of wealth in the same sense as other consumer assets. Unless one holds an ultra-rigid quantity theory of money, a nation holding x dollars of other assets plus y dollars of cash balances is better off than if it holds identical other assets, also valued at x dollars, plus only $(y - k)$ dollars of cash balances. Mr. Goldsmith's proposal seems to strain the concept of a debt or claim in the two extreme cases of fiat money and full-bodied commodity money, although of course the great bulk of debt or promissory money is formally a claim. It seems to lead to the anomalous result that a gold standard country can increase its wealth by shifting part or all of its metallic reserves to use in industry and the arts, and vice versa in the case of a shift in the other direction.

But let me hasten to point out in closing that I know of no solution for the problems raised by money in the national balance sheet that does not lead to some sort of anomaly. The treatment toward which my theoretical prejudices incline is the inclusion of all fiat and all full-bodied commodity money as wealth. This may involve anomalies much larger numerically and more important in practice than that arising from Mr. Goldsmith's proposal. Furthermore, if the criterion for the inclusion of an asset in national wealth is to be economic *productivity* rather than mere *utility*, the elimination of money rests on a more secure footing.

Everett E. Hagen

VALUATION OF PUBLIC WEALTH

It has been suggested that public wealth not used for production for the market should not be included in the aggregate value of the economy's wealth because the value of its services is capitalized into the value of the private wealth which benefits from those services. To include the value of both public and private wealth would be double counting.

If this statement of the argument is correct, I think the argument unsound. The services rendered by public wealth such as a street are financed by tax levies. Suppose that the taxes are property taxes on adjoining property. The reduction in income from the private wealth caused by the property tax is reflected in the capitalized value of that private wealth. If the income yielded by the public properties equals its cost, the increase in the income yielded by the private wealth because of public services, and the reduction in the income from the private wealth because of property taxes, are equal, and the value of the private properties does not include capitalization of any services rendered by the public wealth. The correct total for the value of wealth in the economy must therefore include both private and public wealth.

In two cases, simply adding public and private wealth may lead to a total that in a true sense is 'incorrect': when the services rendered by public wealth do not equal their costs and when they are paid for by taxes (or other revenues) levied upon the income from labor, not upon the income from property.

These cases present anomalous situations. The anomaly in the first case arises because public services not sold in the market cannot consistently be measured by market tests, but must be so measured in an economy dominated by the market if we insist on having a single total for the entire economy. In the second case, the anomaly arises because the institutions of our economic system do not put a capital value on human capacities. Both these anomalous situations cause far-reaching difficulties in many types of economic computation. Their solu-

tion is not approached by excluding public wealth from total wealth.

'INDEX NUMBER PROBLEMS' IN MEASURING WEALTH

It has been suggested also that the measure of wealth should be independent of the income flowing from it. Since the value of wealth is merely the capitalization of the income expected to flow from it in the future, this suggestion at first seems absurd. However, as the discussion has made clear, the issue is merely one aspect of the old familiar 'index number problem': what weights should be used in aggregating items of wealth; in other words, what common characteristic of the items of wealth should be measured.

The usefulness of wealth lies purely in the flow of income it will produce. The income is made up of a flow of services (or of commodities, which in turn may be analyzed into a flow of services). The services or commodities produced by different pieces of wealth cannot be added, for they differ physically. Aggregating them, or aggregating the magnitude of the wealth that produces them, therefore, is a problem in devising weights with which to combine them.

Estimates of wealth are useful only to compare two situations—most commonly the wealth of two economies or of the same economy at different times. The relations between the two situations will depend upon the weights used in aggregating. One set is the market values of the services rendered. If they are used as weights, wealth consists simply of the capitalized value of the services expected to flow from it. A variant of course is the services that would flow from the wealth if used at capacity.

However, weights other than values may be appropriate for various purposes. If one is judging the capacity of the economic system to wage war, the weight given to automobile plants, or steel mills, or to Oak Ridge relative to other items of wealth would properly be far greater than the market value of the plants relative to other items of wealth.

Therefore, conceptually wealth may be independent of the

income flowing from it as the income is measured in the market. Each item of wealth should be given the importance appropriate to the purpose for which the estimate is being made. The object is not to eliminate circularity, or to make possible a comparison of income with the wealth from which it flows, the latter being measured independently of the former. Such attempts arise from the illusion that wealth has some economic (i.e., value) significance independent of the income it can produce.

In a fundamental sense, the statement that different sets of weights should be used for different purposes is simply a way of saying that a given item of wealth will produce more income (relative to other items of wealth) in some situations than in others. If we get away from the market valuation of wealth, we abandon also the market valuation of income. In this broader sense, the importance attaching to wealth is always a reflection of the importance attaching to the income expected to flow from it; wealth has no other meaning.

Franco Modigliani

My comments are prompted by the question: What should be included under wealth in carrying out wealth estimates? I feel that it can be decided only after one has clearly stated the purposes of the estimates. One important purpose of wealth estimates, for instance, is to establish the size distribution of wealth among individuals or groups. If this is our purpose, we should include all assets that can be sold in the market and value them, as far as possible, at their market prices. Among these assets will be such things as monopoly rights (whether they have a legal or only an economic nature) and also all sorts of natural resources (including rivers!) if they are privately owned and have a market value. This concept of individual wealth will not coincide with the capitalized value of an individual income, even if a proper rate of capitalization could be established, mainly because income originates partly from labor and in a system in which slavery does not exist it is impossible to sell the source of labor power as an asset.

While this definition of wealth will be useful in analyzing wealth distribution, it will not be very meaningful for other purposes; for instance, to compare 'national wealth' over time or between countries. For one thing, the aggregate of all individuals' wealth as defined above might well increase under conditions in which the community as a whole is not at all richer or conceivably even poorer from the viewpoint of welfare. Thus, an increase in population will tend to increase the value of land by increasing rents and thus their capitalized value. Yet it will obviously not enhance the welfare of the community. Similarly, the creation of a monopoly will presumably impair the welfare of the community, though it will increase the wealth of the monopolist. To avoid such difficulties it therefore seems advisable, for purposes of comparison of national wealth over time or between regions, to count only the aggregate of all reproducible physical assets at reproduction cost, including publicly owned assets such as roads, bridges, etc. It goes without saying that for certain types of comparison over time (or between regions), adjustment will have to be made for changes in the price level; i.e., for the two periods (or regions) compared, physical assets will have to be valued at reproduction costs of the same period (or region).

Of course national wealth may also be defined, in a way closer to individual wealth, to comprise all sorts of natural resources, including rivers and natural harbors whether privately or publicly owned (and why not sunshine?), and also reproducible physical assets on the basis of capitalized returns rather than reproduction cost. But if we keep shifting our concept consistently in this direction and at the same time want to avoid difficulties of the type discussed above, we shall soon find that the emerging concept of national wealth is nothing more than national income capitalized at some proper rate. But then the question may well be raised why we should engage at all in national wealth estimates. Indeed such estimates would not give us any information not already contained in national income estimates and we might as well give up this task and concentrate on refining our estimates of national income.

R. T. Bowman

My comments are confined to one general aspect of Mr. Goldsmith's paper: the valuation of tangible wealth. Most current discussion of this topic introduces social accounting. Mr. Goldsmith divides social accounting into national business and national economic accounting, defining the latter as national business accounting adjusted to the requirements of economic theory. Presumably social accounting includes income as well as capital accounts.

I find some difficulty in thinking of any type of social accounting that is not economic accounting. Certainly its purpose must be to record economic activity and, by doing so, to provide the basis for explaining it. But the division may be useful, and certainly does no harm, as long as it is recognized that the guiding principle of social accounting, if it is to be something more than a mere gathering together of business accounts, must be economic accounting.

In general the business aspect of social accounting seems to require little more than combining the accounting records of business activity into useful groups and adjusting for incompleteness and contradictions. The consolidation of such records, however, requires a theoretical basis in addition to that established by the rules of business accounting. Such a basis must come from economic theory. Whether present theory can do a good job or must be modified to some better future theory can never be established positively, but current theory is all we have for orientation today.

The data must of course be in the terms and units of the records. When the social accounts are drawn up, however, they must go beyond the original data. The purpose or purposes to which the data are to be put must be known or specified before an appropriate organization of the materials and a significant selection of summary measurement units can be decided upon.

Present economic theory seems to indicate that two measures of wealth would be useful for economic analysis: substantive wealth and claims on it. For immediate purposes, the former

should be given some priority because progress in the measurement and use of national income data is essential. An urgent need is to combine estimates of substantive wealth with those for the labor force and for national income in order to give a more complete account of the resource input and output of the economic system.

In the longer run, considerable attention should be given to the claims approach. The collection and theoretical orientation of balance sheet data, emphasizing the claims positions of various groups, the influences of such positions, and of changes in them, upon economic activity is essential for measuring the personal distribution of wealth and its effect upon the level of income and well-being.

In measuring wealth, many problems are encountered, beginning with the concept itself. I would define wealth as all sources of services, just as I would define income as all services received in a given period, plus net additions to wealth arising from the productive process. Such definitions have little worth, however, except to explain a point of view toward a certain class of data. If we are to accomplish anything analytically by using quantitative data, our generalizations must be directed toward recognizable social categories. The categories chosen must be consistent for wealth and income. In the following discussion I shall proceed in only one such direction, the valuation of substantive assets in the national balance sheet.

From my point of view, the valuation most appropriate for reproducible substantive wealth is depreciated reproduction cost, i.e., the current year money value of the resource inputs currently required to produce tangible wealth similar in productive output to the existing stock. Such a measure allows us to think of wealth as income in process, in terms comparable with national income in current dollars. Furthermore, since the depreciation figures used to 'net' the national income figures are generally considered to be in terms of reproduction cost, beginning and ending inventories of reproducible wealth can be compared more directly with the portion used up during the income period. This is not an attempt to evaluate in

conformity with the 'economic principle' but would enable us to make generalizations concerning the degree to which reproducible resources are being allocated in accordance with that principle. This method makes it much easier to choose the values at which to include certain government tangible reproducible assets. Whatever the market value of such assets, their reproduction would necessitate resource inputs comparable in most respects to inputs required in other sectors of the economy.

Nonreproducible tangible assets cannot be valued in this fashion. Moreover, they are comparable with reproducible assets only at the margin. Since, generally, they do have alternative uses and may be substituted at the margin for reproducible assets, it would seem best to value them at current market prices. The over-all supply of nonreproducible assets cannot increase; hence their special short and long run positive rent elements do not have the same consequences as the quasi-rent elements in reproducible assets. They may, however, be shifted from one use to another; their market values reflect these shifts.

The method of valuation suggested for the two classes of tangible wealth assumes that the usefulness in economic activity of specific types of tangible goods changes slowly and that their input costs, therefore, have significance for the production of income. Unless such an assumption can be made, no measure of wealth can have any permanent meaning. The method assumes too that resources not transferred or transferable in the markets, or not essentially similar to them, will be excluded. The 'free' resources of rivers, of air, and of sunshine are excluded only because their utility permeates all other resources and their use for any one purpose does not preclude their use for other purposes. Their exclusion from wealth is in accordance with the same principle as their exclusion from income.

If this method is used for each current period it becomes immediately necessary, for purposes of comparison, to convert a time sequence of such measures into one that indicates an increase or decrease in the amount of wealth devoted to the

economic process. In the case of assets valued at depreciated reproduction cost, considerable difficulty is encountered, as in estimating current depreciated reproduction values themselves. Presumably it can be done only in terms of indexes of construction cost for different kinds of assets. The usual values appearing in business accounts are original costs at different past dates for the several classes of assets.

If we consider only the general input-output problem, we need not estimate wealth as frequently as national income. Once an estimate for a comprehensive base period has been made, the important categories of reproducible wealth can be kept up to date from current estimates of national income. National income accounting, however, will have to be broadened to provide a complete record of all additions to or subtractions from wealth. Specific attention should be given these items so that a current and historically comparable series of wealth estimates may be maintained.

W. S. Woytinsky

National wealth can be defined by analogy with national income. Both concepts are derived from the consolidation of estimated wealths and incomes of individuals. On the side of national income we list such items as wages and salaries, profits, interest and rents. The items to be included in national wealth depend upon the purpose for which the aggregate is computed.

In my opinion the main purpose of estimates of national wealth is to provide a yardstick for appraising the growth and distribution of national resources in relation to current national production. If it is, the aggregate of national wealth can be built up in various ways; for example, by recording the wealth of each individual or each family in each city block as in a census of population; or by using a stratified sample and inflating recorded figures by some carefully established formula. The method of estimating national wealth by capitalizing national income should be excluded, since it would give no insight into the distribution of national resources (or national wealth) in relation to current production.

Of the various procedures, the following seems logical: classify current incomes in such a way that each group of incomes is related to certain assets; compute the value of each group of resources, and consolidate the single items. For example, incomes of farmers and farm laborers are related to the value of farms, which includes improvement of land, the value of buildings, livestock, equipment, and the like. The aggregate value of all farms is entered in national wealth as a separate item.

Incomes of manufacturers and factory workers are related to the value of factories. This item, including the value of the ground, buildings, machinery, patents, inventories, and the like—in other words, the entire capital in manufacturing industries—constitutes another item of national wealth.

Proceeding in this way one can cover a large part of national income and various items of national wealth. The aggregate of assets and liabilities. If, as Professor Hart and I both believe, a wealth this item corresponds to the rents received by house owners and the imputed value of dwellings occupied by owners. Likewise, the value of publicly owned utilities will be included.

Such an enumeration will not be exhaustive, however. It will not cover persons in professional, personal, or public services. On the asset side, publicly owned harbors, bridges, highways, hospitals, schools, national parks, recreational grounds, and the like are conspicuous by their absence. Not accounted for also are such items as potential resources—subsoil, unutilized water power, publicly owned forests, and rivers.

Some of these residual items of national assets parallel residual items of income just as the value of farms or factories parallels the incomes in the respective sectors of the economy. For example, services of persons in educational professions are performed in an environment provided by investments in schools and other educational institutions; medical services are supported by hospitals, sanitation facilities, water supply, and the like. The fact that no profit is calculated on these investments does not alter their economic nature. They are assets in

the strict economic sense. Their dividend appears in the increased productivity of the national labor force, lower death rates, a longer life span. A nation whose children must go to school for at least 8 years and may expect to live to be 65 years old is richer than a nation whose children can leave school after 4 years and cannot expect to live longer than 35 years. It is richer not only in terms of welfare but also in dollars and cents, because its output per manhour—however measured—is larger. Consumers receive the dividends just as they pay the current cost of the production of the respective services.

For similar reasons the capital value of highways, harbors, bridges, dams, and public buildings should be counted in aggregate national wealth. All these assets bring dividends directly to consumers. It would be illogical indeed to count in national product the work performed in constructing a bridge and not to record its value in national wealth. The duplication arising from counting in national wealth the increment to the value of ground adjacent to a new highway as well as the value of the highway itself does not matter, for some neighboring land may be impaired in value. Similarly, the construction of a factory, apartment house, or theatre changes values in the entire neighborhood.

Computing national wealth as the sum of items with market value or measurable capital value would exclude such items as unexploited, or undiscovered, soil resources, sun- and moonlight.

J. B. D. Derksen

I would like to comment on two points that did not, I believe, receive sufficient attention in the discussion of Mr. Goldsmith's stimulating paper.

The first is the effect of price controls upon wealth estimates. A well known example is rent controls, which affect the prices of houses. Should the value of real estate not be adjusted for this influence? For the United States it may not be easy to ascertain the effect of rent controls upon the prices of real estate, but in countries where there are official ceilings on the

prices of houses, as well as rent controls, the situation may be different. In principle, at least three methods of evaluation are possible: based on the established ceilings; the capitalized controlled rents minus costs of maintenance, repairs, etc. borne by the owners; and replacement costs.

In a controlled or planned economy, interest rates are usually kept artificially low. Thus in estimating national wealth by capitalizing returns, it may be necessary to substitute a 'true' interest rate, based on the actual supply of capital goods. Such a procedure has been suggested for countries where capital goods are scarce, as the official interest rates cannot be used as a basis for decisions regarding investment programs. The method is, however, extremely difficult to apply as it requires factual knowledge of production functions. These problems may seem rather theoretical, but they are important, for example, if the national wealth, by totals and major groups, of different countries are to be compared.

The second point is the problem of evaluating national wealth in countries where all major industries are nationalized. In the more familiar case, where only some industries, usually public utilities, the central bank, or some railroads or mining companies are owned by the government, wealth is estimated by the same principles as wealth in the private sector. If all major industries are nationalized, these principles cannot be applied and it seems rather difficult to establish others. When only some enterprises are owned by government, they are usually managed in accordance with rules that prevail in private industry; after nationalization has become complete, the profit motive does not play the same role.

Gardiner C. Means

I have been requested to comment not only on Professor Hart's paper but also on the broader aspects of measuring wealth. Three matters seem to me most worthy of comment: one has to do with the use of words, one with accounting theory, and one with Professor Hart's discussion of uses of national balance sheet data.

First, the question of words: I wonder if we are not introducing serious confusion into our thinking and discussion by regarding the immediate problem as one of estimating national wealth. Among the eleven papers prepared for this meeting which I checked, five indicate that they are concerned with estimating national wealth or some wealth component. Three papers do not mention wealth, but are concerned with estimating assets or assets and liabilities for a particular sector of the economy. Three others seem to use 'wealth' and 'assets' as if they were more or less interchangeable. It seems to me that the present undertaking has to do with assets (and liabilities), not with wealth.

You may think this is a minor matter of words. My experience suggests otherwise. When Adolf Berle and I began working on *The Modern Corporation and Private Property* we used 'wealth' and 'property' more or less interchangeably. After a while we found each of us was using the terms quite differently. When Berle said property or wealth he was referring to a legal situation; for example, he was envisaging what a man could get the courts to do if somebody appropriated his possessions. When I used the terms, I was referring to an economic situation; for example, how much a man would get in exchange for his possessions. Once this difference in use was clear, we agreed to restrict the term 'property' to the complex of legal relationships and 'wealth' to the complex of economic relationships. In most concrete situations both wealth and property might be involved though bootleg liquor could be wealth without being property and a worthless piece of land could be property without being wealth. What is more important here, however, is that when we wanted to bring into view the history and logic of law we used the term property and when we were seeking to bring into the foreground the history and logic of economics we used the term wealth.

This Conference is concerned with neither the history and logic of law nor that of economics. We are seeking to apply the history and logic of accounting. Yet wealth is not an accounting term. The term 'asset' plays the role in the logic of ac-

counting that is played in economics by 'wealth' and in law by 'property'. Indeed, an accountant will not include an item in a balance sheet as an asset unless it is *both* wealth and property. The item must have value and the company must have property rights in it.

Income and wealth are customarily discussed as closely associated concepts in a system of thought. It may seem natural, therefore, to assume that having made estimates of national income, a complementary action would be to make estimates of national wealth. But 'income', unlike 'wealth', belongs to the history and logic of accounting as well as the history and logic of economics. When we estimate national income through a process of social accounting we are applying the logic of accounting, not that of economics. The end product is an estimate of income, using that term to refer to the accounting concept of income, not the economic concept, even though the two may be closely parallel. If this conclusion is accepted, the estimate complementary to national income is national assets, not national wealth, i.e., an estimate resulting from an application of accounting principles, not those of economics.

The relevance of this distinction can be indicated by referring to Mr. Goldsmith's paper. He distinguishes between 'business' and 'economic' accounting. The first leads to estimates of assets (and liabilities). The second is not a matter of accounting but of valuation and leads to estimates of national wealth. Mr. Goldsmith presents very cogent reasons for not accepting as an estimate of national wealth the estimate of the net assets of a nation arrived at by applying the principles of business accounting. I would go further and say that the application of the most perfectly designed system of social accounting would not yield an estimate of national wealth. It could provide a starting point for applying economic concepts in order to arrive at an estimate of national wealth. But this application of economic concepts would be the economic revaluation of accounting results, not a process of economic accounting.

The practical implications of this analysis lead to two sug-

gestions. First, I suggest that in oral and written discussion, we refer to the estimates that are the immediate objective of this Conference as estimates of national assets and liabilities or perhaps better as national balance sheets, not as estimates of national wealth. This would follow the 'pure accounting approach' employed in three of the eleven papers I examined.

Second, and with some trepidation, I suggest that this Conference limit its activity to social accounting and leave the much more treacherous task of estimating national wealth to other agencies.

My second major comment is to suggest the need for an intensive examination of the logic of social accounting. Here I am not referring to what Mr. Goldsmith calls economic accounting. Rather I am referring to business accounting as applied to the creation of national balance sheet and income statements. Nor am I suggesting that the perfect logic of business accounting would not serve as the perfect logic of social accounting. I would say that the perfect logic in the two cases would be identical. But business accounting as we know it today is full of practical compromises which are useful to business accounting and not necessarily useful to social accounting.

Take, for example, the business accounting practice of valuing inventories at the lower of cost or market. This is good conservative practice and quite appropriate to many businesses. It is a matter of practical business conservatism, however, not a product of accounting logic. Or take the problem of real versus money values. Business accounting has, for the most part, stuck to money values, though the Germans developed some methods for introducing changes in the value of money. The logic of accounting would almost certainly depart from these practical compromises and it is the logic of accounting, not the practical business compromise, that is relevant to the theory of social accounting. Social accounting will have its own practical compromises to make, some of which will grow out of the practical compromises reflected in business statistics. But I believe that we would have a sounder basis for developing national balance sheets if we were clearer about the logic of

accounting and fully recognized the compromises as they are forced upon us.

A reexamination of accounting theory for social accounting purposes should give attention to the historical development of accounting thought. Until quite recently accounting theory has been almost entirely a cost accounting theory. Its objectives were to allocate costs to final products, or, more exactly, to relate the amounts of money paid out for goods and services to the amounts of money taken in for goods and services by allocating the first to the second. This procedure has run into serious logical difficulties because all goods are produced under conditions of joint cost. The problem of depreciation is one of joint cost, with the time factor as an added complication. In some industries such as meat packing the most immediate operating costs are joint costs. In all businesses overhead costs are joint costs. Indeed, the really knotty problems of traditional accounting grow out of joint costs.

More recently a new approach has been creeping into business accounting—an approach I would like to call ‘utility accounting’. Exemplified in the practices of some department stores which value their inventory at what they expect to sell it for minus the normal mark-up, this procedure reverses the ordinary process of accounting. The line of allocation moves backward from the amounts of money expected to be taken in rather than forward from the amounts paid out. This approach opens up a whole new realm of possibilities, some of which are well developed in Professor Canning’s brilliant book, *The Economics of Accounting*.

But utility accounting must face a difficulty no less serious to its logic than joint cost is to the logic of cost accounting. It has the problem of joint utility. The meat packer who chops a cow up into parts has no cost accounting logic to establish the cost of each part. The automobile manufacturer who assembles many separate parts into a single product has no utility accounting logic to establish the utility of each part. The meat packer can use utility accounting; the auto maker, cost accounting.

But both cost and utility accounting are in difficulty when it comes to problems of overhead and depreciation. I believe, perhaps quite without warrant, that a combination of the pure logic of cost accounting and the pure logic of utility accounting would go far toward providing a more satisfactory basis for a comprehensive accounting logic. Such a logic would be useful to both business and social accounting, setting up standards by which to judge whether the practical compromises adopted in either business or social accounting practice seriously compromise the objectives of accounting.

I, therefore, propose that some work be undertaken in the logic of accounting. For the carrying out of such studies I have three suggestions: that combining the logics of cost and utility accounting be emphasized; that attention be given to the German accounting studies made after the first World War, which attempted to adjust for changes in the value of money by measuring capital in real rather than money terms; and that for purposes of clarifying accounting logic, dead concerns, either real or hypothetical, be analyzed. The purpose of business accounting is to describe as clearly as possible the condition and development of a concern at some time between its birth and death. By taking a concern whose life cycle is complete, one can, with the aid of hindsight, determine its condition at intermediate points more precisely than with foresight alone. If logical methods for the accurate description of a concern's condition at different times can be developed by the aid of hindsight, it may be easier to develop the appropriate logic from foresight. I think much could be accomplished along these lines.

Now I come to Professor Hart's paper. To me, of course, his subject is 'Uses of National Assets Estimates', not 'Uses of National Wealth Estimates'; or better still, 'Uses of National Balance Sheet Data'. I am fully in accord with his emphasis on motivating relationships as the prime use of national balance sheet data. Such data can perform a useful service in the mechanics of checking income estimates. And our sense of logical elegance requires a national balance sheet to place alongside

our national income figures. The balance sheet would provide also an aggregate asset figure from which it might be possible, with sufficient theoretical and statistical travail, to derive an estimate of national wealth, though I am more skeptical than Mr. Goldsmith about the usefulness of the results. Presumably a nation gets poorer if its natural resources are depleted. But the depletion can raise the *value* of the remaining resources so that the figure for national wealth increases. Of what social usefulness is such a figure?

To come back to the national balance sheet—I believe that some of the very bad forecasting of national demand and employment at the close of the war was due to the failure to take account of the changed asset position of individuals and enterprises. Under normal peacetime conditions, changes in asset and liability position are likely to be so gradual that their effects on individual behavior get lost in the catch-all of trends. The war vitally altered both the amount and the liquidity of assets and liabilities. If, as Professor Hart and I both believe, a change in assets is likely to modify the propensities to consume and to invest, then the war increase in assets could be expected to raise more or less permanently the level about which the propensities to consume and invest fluctuate. This shift in propensities, which is, I think, clearly reflected in current statistics, could explain the major error of those who projected prewar propensities adjusted only for the temporary backlog of demand.

A little consideration of some items in the balance sheet raises some fascinating questions concerning economic behavior. From 1935 to 1939 the money holdings of individuals increased more rapidly than the money holdings of business, according to Mr. Copeland's paper. But from 1939 to 1942, the opposite was true. Some preliminary current figures suggest that more recently money holdings of individuals have been increasing while the money holdings of business have been going down. What do these relative shifts in money holdings mean for economic behavior?

Or consider the great mass of government securities out-

standing. Will it constitute an undigested hunk of dough in our body politic or will it be built into our structure of assets in a stable fashion? Who owns these securities? How is the ownership shifting? And what are the implications of the shift?

Or take the plant and equipment of industry in relation to output; the debt of farmers in relation to the value of their land and their incomes; the assets and liabilities of insurance companies in relation to other investment assets and liabilities; or the question Homer Jones is stressing, the relation of debt to equity investment.

It is characteristic of each of these questions that it can be answered, or at least adequately analyzed, without national balance sheets. Each requires asset and liability data on only one sector of the economy. But complete national balance sheets will provide essential data for each and is likely to raise many more similar questions. For these problems, balance sheet data will render the same kind of service that income data render for problems of economic development and behavior. In my opinion the balance sheet data as a whole and in their separate parts are just as essential as the corresponding income data. In combination they are the factual starting point for a real understanding of our economy.

Roy J. Burroughs

Mr. Means' suggestion that in preparing a national balance sheet the concepts of accounting and law are likely to be more appropriate than those of economic theory merits serious consideration. Goldsmith's desire to relate balance sheet concepts to those of economic theory cannot be entirely satisfied. The business enterprise is the institution to which business accounts apply. The national economy, however defined, is the institution to which social accounts apply.

The eminent accounting theoretician, W. A. Paton, always emphasized that the balance sheet is an equation. The sum of the values of the objects of the inventory are by convention necessarily equal to the sum of the values of the property rights ('equities' he calls them, 'claims' we are calling them). Prop-

erty is a legal concept. 'Value' is an economic concept with various connotations. The values on a firm's balance sheet are usually not the current or 'normal' exchange values of the economist. Rather they represent an historical statement of former outlays minus an expiration of value in production. The accountant's cost is not the economist's cost. To the accountant, cost is figured prior to the residual profit. 'Normal' profit to the neo-classical economist is often regarded as a necessary social cost of production. Other differences will doubtless occur to those who give the subject a little thought.

Business accounting shows how financial resources are allocated among production uses; it permits the computation of net returns after allowance for expenses including depreciation; and, from the schedule of claims on the right side of the typical American balance sheet, it provides for the distribution of income. It thus measures results in terms of values.

Conceivably, social accounting could be used for somewhat similar purposes. But the balance sheet and income statement would have to be consistent.

Many are the conventions and implicit assumptions that underlie business accounting.¹ The conventions and assumptions underlying the balance sheet phase of social accounting are largely unformulated. It therefore behooves us to consider our postulates while we are struggling with expediency. Moreover, let it not be forgotten that expediency is often a more significant guide to business accounting than consistency. Attempt consistency, but don't expect to attain it.²

The capital consumed in producing national income can be computed with more certainty from the balance sheet. Many valuations of the balance sheet expire as income is produced. There is a transmutation, as it were, of capital into gross income. Net income cannot be determined without an allowance for capital consumption.

¹ See, for example, W. A. Paton, *Accounting Theory* (Ronald Press, 1922), Ch. XX, 'Postulates of Accounting'.

² If you would be a man of good conscience, pay high honor to *Consistency*—but honor Her at a distance. For unless you would suffer madness, seek not to hold Her to your bosom—She will elude all but your merest touch.

Were a national balance sheet employed, depletion could be charged against income just as depreciation is now charged. Newly discovered resources would not be credited to income but would be entered directly in the balance sheet, both as assets and as valuable claims. Even an allowance for depletion of agricultural land might be in order. The nonmonetary human costs of production—disease, injury, premature aging, etc.—would be more difficult to recognize, as human capital cannot well be placed on a chattel basis for inclusion in the balance sheet, though theoretically it can.

Obviously, balance sheets will not reveal relative welfare as between countries or periods. When any class of goods is more plentiful than usual, balance sheet values shrink. The better the weal, assuming appropriate balance, the smaller the assets. Moreover, current balance sheets do not recognize the claims of posterity on natural resources. The valuations placed on our natural resources are astonishingly low. Even high values may not properly reflect the long run importance of agricultural land to the nation. Apart from the costs of extraction and processing, many generically important resources with limited reserves—petroleum, copper, iron, etc.—are virtually free goods. This is rational from the viewpoint of any given generation. Possibly it is rational from a longer run point of view if we are sufficiently optimistic about our capacity to develop alternative sources of energy and material. Conceivably, however, a socialistic state might wish to place a higher value on resources, charge present users a higher rate, and discount future incomes at a much lower rate. This could be done with the tools of social accounting.

One of the first decisions facing the Conference concerns the nature of the assets to be included in the national balance sheet. For the purpose of determining how resources are allocated and for computing the expiration of capital values in the process of production, it would seem that tangible assets to which property rights can be taken, plus intangibles with a determinable cost of production or with a separate market value apart from attachment to a going concern, might be in-

cluded. Patents and copyrights are in the latter class; goodwill is not. By this criterion the assets would represent the sum of the values of the separate items of an inventory of existing goods, including transferable processes or ideas other than the going concerns themselves.

The objection to the inclusion of goodwill, except possibly that arising from foreign sales, is that goodwill is not a resource to be allocated or used to compute the expiration of capital values in production. Nor is it generically significant to the society in which it exists; i.e., society is neither the better nor worse equipped for production whether goodwill is or is not existent. In business accounting goodwill appears when a new owner takes over a going concern having an element of monopoly income, and it is usually written off rapidly—not as a charge to income but as a charge to surplus (claims). Recognizing such monopoly values is inconsistent with the concept that assets are an inventory of separate items without respect to the institutional patterns that may be used to organize them for production.

Goodwill contributes nothing to national real income. On the theory that monopoly income could be taxed away without reducing incentive or output, so goodwill could be removed by competition or taxation without any loss of real income or of real capital. If goodwill is included in the national balance sheet, it will be on the ground of expediency rather than of logic. Its inclusion may permit an easier matching of assets with claims.

In the case of patents a temporary monopoly is granted as an incentive to invention. Although the legal monopoly is sometimes abused and even used to stifle progress, as long as the incentive theory is held by the law and is at least substantially true, the social accountant had best recognize it.

Reference has already been made to Goldsmith's paper, especially to his dictum that the "values entering into the system of national accounts" should conform to "economic principle". It may be added that there is no practical method for evaluating everything as it would be valued under pure com-

petition. Even if there were a practical method it would not necessarily be ideal. Society might choose to place a floor under some values out of consideration for human personality irrespective of economic productivity. Perhaps no theory of economic value would fit all possible judgments derived, say, from a system of morals in which an individual of this and succeeding generations was given a high value. Moreover, on practical grounds again, who is to say what the 'logical pure market rate of interest' is, apart from evidences of the market itself?

The 'earned net worth' approach to national accounting discussed by Goldsmith is followed by the Bureau of Agricultural Economics. However, in contrast to conventional business accounting, the base values against which depreciation is computed are adjusted each year to the market. Then depreciation figured on current values is subtracted as an expense—essentially as it would be in an 'earned net worth' procedure.

Concerning Hart's paper, just a minor question: Are the 'mechanical' and 'motivating' relationships anything more than a backward look at resources and results before setting goals? The 'motivating' aspect comes from the intelligent allocation and direction of economic resources in the light of the accounts. This is done by the going concern; it is a legitimate use of social accounts to persuade enterprisers to agree on goals or to permit direct social management of resources.

Homer Jones

If steps are taken to improve estimates of wealth, a great deal of attention should be given to changes in equity relative to debt. Of course if we improve both our total wealth and debt figures, the equity figures will automatically be improved. We should get annual data and give full weight to changes due to fluctuations in prices. When prices are rising, equities increase at a faster rate. The opposite holds when prices are declining. The windfall to equity holders when prices rise is of great significance to spending. They are and they feel wealthier. They are willing to go into debt to get funds with which to increase their cash balances and their real investments. Even

the equity holder who is not in debt and whose holdings increase in value only *pari passu* with the general price level and with his income probably feels richer and is willing to act accordingly.

The farmer whose equity increases relative to debt because the value of his land and other assets has increased will not behave as he would if prices had not risen. Any increase in his wealth, deflated for changes in the price level, is just as real and just as significant for his actions as if the increase had come from savings. If this observation has validity for farmers, it surely holds also for the operators of other unincorporated businesses and owners of houses. In the case of corporations the redistribution of wealth resulting from inflation may have an effect at two points: on the actions of stockholders or on the decisions of corporate managers. At present the latter seem to be more affected. The difference between the market value of corporate shares and the value the shares represent as measured by other means is significant. One benefit that should follow from improving estimates of wealth is capacity to analyze this difference and its changes.

The uses of wealth data to which I have alluded imply a knowledge of changes in many wealth components at frequent intervals. But this does not mean that we need frequent censuses of wealth. Once we have a fair knowledge of the wealth in various sectors and of the chief categories of claims in each, we can keep it up to date by information concerning new construction and changes in prices of various categories of wealth.

Curiously enough, in the 1930's interest in wealth data in general declined almost to the vanishing point, and considerable attention was devoted to debt statistics. The debt data have been kept current and have continued to be of interest. But surely for these debt data to be of substantial significance we need comparable equity data. And we need to know something about debt charges in relation to property income in various significant categories. I believe we should invest considerable effort in improving our debt data. Even more impor-

tant is knowledge concerning equities, debt charges, and property income in various economic categories.

Not only do we need to know more about the structure of liabilities and equities of households and business units but also about who holds the claims and equities and how they are managed. For example, we have only a vague idea how much wealth is in the hands of trustees. We know little about the distribution of various types of debt and equity claims among income groups. The ownership of and changes in the wealth of women, old men, and others who are inactive in a business way are surely of great significance.

Traditionally the relation between equity and debt from the standpoint of ultimate claimants as a whole has been substantially identical with that from the standpoint of users of wealth as a whole. But we may be seeing the beginnings of a development that will alter this situation. To the extent that intermediary institutions such as life insurance companies and mutual savings banks acquire equities while securing their funds through the issue of debts, equities may decline in significance from the standpoint of ultimate claimants and play an increasing role from the standpoint of managers of real wealth. It will probably not be difficult to consider this development in the formation of wealth and claims statistics.

One objective should be a close coordination between wealth and income statistics. From one significant standpoint a rise in prices reduces the income of creditors; when prices decline, the effect is the opposite. Likewise the equity holders who are in debt receive an addition to their income when prices rise and suffer a loss when prices fall.

The adequacy or inadequacy of depreciation charges may be pertinent in connection with an analysis of the redistribution of wealth due to inflation and deflation. Inadequate depreciation charges during inflation may be thought of as counteracting an improvement in the relative status of equities. If they are treated, as they should be, as an adjustment of profits, equities from retained earnings will be smaller. But the old equity will nevertheless increase relative to debt. The sugges-

tion has been made also that great technological advances in important fields in the last few years have caused an obsolescence far outstripping the depreciation charges, quite aside from the inflation factor. This may well be; nevertheless, the position of equity relative to debt is better than it would be had we not had the inflation.

The need for much better information concerning the relation of debt service costs to profits and property income as a whole takes us out of the immediate field of wealth statistics, but is so closely connected with the relation of debt to equity that both fields should be cultivated.

I am not sure whether, strictly speaking, statistics of corporate security issues and their retirement belong to wealth statistics but it seems so to me. Data on the issue and retirement of claims against corporations are far from adequate. It is just as important to understand changes in claims better as to know the status of claims at particular times.

Wealth statistics should be pushed ahead until good estimates are available for the end of each year and are tied in reasonably well with income statistics.

I agree with Morris Copeland that preferred stock should receive special consideration. For most purposes of economic analysis preferred stock has more in common with debt claims than with equity claims.

Original cost figures are not always the most useful basis for wealth data. But in one respect they seem to me important. Intermediary institutions should not have to be concerned with declines in the value of their assets except when the decline is larger than in economic assets in general. For example, the housing projects of life insurance companies and mutual savings banks should be valued on a cost basis no matter what happens to the general price level or business activity.

Useful purposes may be served by estimates of global wealth. In fact, a variety of global concepts may be in order. Even if agreement cannot be reached on concepts of global wealth or if the concept is deemed meaningless, we should try to get better data on wealth in various important categories. It is by

category of wealth, or by class of persons, or by classes of business enterprises that the debt-equity ratios and the debt charge-income ratios are of most significance.

The use of wealth statistics for sectors of the economy bears upon the question whether land should be treated as wealth. From the standpoint of certain global concepts of wealth, land may or may not be an appropriate significant part. But in the debt-equity ratios of sectors of the economy, land values are just as significant as any other capital assets and should not be omitted.

Professor Hart has said that the chief reason for discontinuing the collection of wealth data was the misuses made of them. I do not know whether this was the controlling reason, but in my opinion it is not a cogent one. If there is a demand for statistics they should be collected even though the collectors fear they will be misused. Those who wanted to misuse wealth data have not hesitated to concoct their own. It is unfortunate that wealth statistics have been ignored for a quarter of a century; we have a great deal of ground to make up. Just as economic theory in certain respects marks time awaiting better wealth statistics, so economic analysis of the mechanics of the flow of savings into investment, in which I am currently interested, is impeded by a lack of data.

E. D. Domar

What interested me especially in Mr. Hart's paper was its implications for further developments in economic theory. The well-known maximization of profits objective permeates so much of our thinking about business that we are not always aware that our conclusions on such subjects as tax incidence and wage policy are colored by it. For instance, we all know the textbook conclusion that a corporate income tax does not affect a firm's decisions regarding the scale of output and of investment. Since, however, the firm may minimize risk as well as maximize profits, this conclusion no longer holds in the general case. Similarly, if you decide (as Professor Marschak did in an unpublished paper) that the results of a firm's decisions

should be expressed as some probability distribution rather than a single specific value, the conclusion that the income tax does not affect output is not true.

What Mr. Hart did was to bring the balance sheet into the picture. Clearly, the balance sheet is important to business men, yet it plays a very small role in economic theory. For instance, we are told in accounting that the ratio between current assets and current liabilities is important. Evidently its size may affect business decisions. Yet this ratio is scarcely mentioned in economic theory.

The argument whether national wealth should be estimated from the viewpoint of historical cost or by capitalization has led me to feel that the method should depend upon the purpose. For instance, when we conceive national wealth as made up of individuals' claims or when we talk about the distribution of wealth by groups (such as size groups) the capitalization method is called for. Or to give another example—I noticed in Mr. Goldsmith's paper a small table showing the historical decline of the capitalized value of land as a share in total national wealth. I can hardly think of a better illustration of the decline of the power of the landed aristocracy. And here the capitalization method is called for.

In other problems the capitalization method would make little or no sense. For instance, if you are concerned with the industrialization of an undeveloped country such as India or China, and you ask yourself how much capital will be needed to achieve a certain increase in total output, clearly what you have in mind is an increase in capital stock from the cost point of view. However difficult it is to define capital stock, conceptually and statistically, problems of this kind must be faced. Surely we cannot assume that output per manhour in an undeveloped country will grow at a certain rate irrespective of capital accumulation, as we often—incorrectly—do.

C. Reinold Noyes

THE QUESTION OF WEALTH AGGREGATES

The Conference project looking toward the development of estimates of wealth seems to have great possibilities. However, there are certain special conditions in this field that pose difficulties which have not been encountered in income studies. The following suggestions are purely cautionary: they are made on the basis of personal experience with a wholly different approach to this subject—the property structure or financial structure as presented in *The Institution of Property*—and they are made by one who is almost completely ignorant of the statistical material available. Nevertheless, they may have some value to those who work in the field.

1) It will be well to keep separate the estimates for the public economy and the private economy. In fact, it will also be well to divide the public economy into its two parts, the federal government on one hand, and the state and local governments, on the other, since the status of the two are so different. The efforts to combine government with private income have been difficult and not entirely satisfactory. The efforts to combine public and private wealth would be even more difficult and even less satisfactory. A few of the reasons for the above suggestion may be given briefly:

a) The bases of valuation for real assets in the public economy are quite different from those in the private—for instance, land values, military and naval equipment.

b) The economic function of the public economy is largely different from that of the private economy—more so in the case of the federal government than in the case of state and local governments.

c) It will be possible to draw up estimates both of real wealth and of net worth for the two parts of the public economy, whereas that will not be possible for the private economy. This, because the problem of valuation of 'equities' is not met in the public economy.

d) The federal deficit is either a bad debt or a contingent

liability of the private economy. If the two statements were to be consolidated, the federal deficit would disappear; but the fact that it had been made to disappear would be concealed. That is, such treatment would not make it evident either that the holdings of federal securities had been written down in the statement of the private economy or that a corresponding reserve had been set up on the asset side.

2) In the estimates for the private economy it will be well to continue the present practice of keeping separate estimates for land values and estimates for reproducible wealth. The reasons for this are:

a) The quantity of land does not increase, whereas that of reproducible wealth normally does so.

b) The bases of valuation are wholly different, since raw land has no real cost.

c) Land values cannot be deflated with a price index.

d) Aggregate land values seem to increase with population growth and particularly with economic centralization. Deflated values of reproducible wealth seem to reflect economic progress in general.

2a) The subsidiary question arises as to whether it is possible to separate man-made improvements, other than buildings, from the values of land. I doubt that it is possible. One could not now estimate what it cost the Pennsylvania Dutch and the Scotch Irish to clear northeastern Pennsylvania. But to Tucker and Carey, one hundred years ago, that clearing was an outstanding example of very costful man-made improvements. On the other hand, on the western prairies there was, practically speaking, no such cost.

2b) Another subsidiary question is that of segregating subsoil resources from other land values. Generally speaking, land values reflect all natural resources located thereon or therein or accessible thereto. There seems to be no sound reason for treating subsoil resources differently from others, such as soil resources, forests, or fish in lakes and rivers. Again, the list of subsoil resources has changed greatly even in our lifetimes. Exhaustion, new discoveries, obsolescence of types of resource

and new types of resource are almost accidental variables. Finally, the basis for estimating subsoil resources is so partial as to misrepresent the probable aggregates. Many are not estimated at all, and the 'discovery values' of those which are estimated are largely artificial, being a form of immunity from taxation to encourage discovery and exploitation.

3) If the estimates of private real wealth in the form of land and that in the form of reproducible wealth are kept separate, they will both be of great value and interest. Reproducible wealth estimates need much work to improve their accuracy, particularly in the direction of reconciling census estimates with those derived from capital formation data. However, any attempt to reconcile the figures for aggregate private real wealth (land and reproducible wealth) with the figures for aggregate private net worth will, in my judgment, be fruitless. The reasons for this are discussed below.

4) There is a grave question whether estimates of aggregate net worth would have any validity whatever. My studies lead me to conclude that aggregate private net worth is the sum of the net worth of what I termed "final personal and final impersonal funds" (*The Institution of Property*, Ch. 7). These correspond approximately to what Mr. Goldsmith terms "ultimate economic units". On the asset side, this aggregate includes real wealth in possession of such ultimate units, but it also includes the value of all their property interests in intermediate units. The reasons for believing that a consolidated statement of private net worth would be a fruitless undertaking are:

a) Property interests in intermediate units, when these are sole proprietorships and partnerships, are actually valued at the net worth of such units. This regardless of the income derived. However, when such property interests are represented by the securities in corporations, their value almost never coincides with the book value of the corporation's assets. They are valued at a market which represents some rate of capitalization of the income to security holders. Thus these two segments are actually valued on two different bases.

b) Many of the interests in corporations have no market.

For these, as for interests in sole proprietorships and partnerships, one cannot safely impute a rate of capitalization in order to derive a quasi-market value from the earnings. Members of the Conference are certainly not competent to make such appraisals, and it is doubtful whether even competent appraisers would attempt to do so in the mass.

c) Those interests in intermediates which do have a market will show wild gyrations. It is my recollection that the aggregate market value of stocks listed on the New York Stock Exchange dropped from about ninety billion dollars to about thirty billion dollars from 1929 to 1932. Such aggregates vary radically with business cycles. But it would be difficult to derive anything meaningful from their changes over longer periods.

d) Theoretically, the aggregate of net worth and the aggregate of real wealth are merely two aspects of the same thing. Actually, the two levels of proprietorship—ultimate property and possessory property—are and should be valued on different bases. The basis of the first varies as noted above; that of the second is cost, or reproduction cost. To attempt to impose the capitalization of earnings basis on both, as Marshall did with his quasi-rent on reproducible wealth, seems to me to be a plain case of ignoring the facts. Real wealth cannot be valued on the basis of capitalization of income, whereas a share of stock is only valued on that basis. The difference here is as radical as is that between the basis for land values and the basis for reproducible wealth values. Moreover, in the case of the net worth of ultimate units, these two bases of valuation are necessarily jumbled together to the extent that the assets are a mixture of real wealth used for domestic purposes or for business purposes (sole proprietorships and partnerships), or, on the other hand, are securities representing property interests in intermediate units. It is true that the individual balance sheet is drawn on this heterogeneous basis. But, when the individual balance sheets are aggregated, the result will have little significance.

It might be possible, as Professor Hart has suggested, to

escape this difficulty by consolidating the balance sheets of intermediate units at the book value of their assets rather than at the market value of their liabilities. That would make possible an imputation at such values to the ultimate units, in place of the market values of the bonds and stocks. And that would derive a formally correct balance sheet of the private economy. It would be based on a single valuation basis and would thus have significance. It would not, however, represent the meaning of aggregate net worth of individuals as a factor in decisions. Nor would it coincide with the book values of these individuals. Moreover, when all that had been done, it would merely constitute a duplicate of the aggregate values of land and reproducible wealth in the private economy. All financial resources which are a liability to one and an asset to another would be eliminated. The government debt in private hands would fail to cancel out. As stated above, however, the federal deficit is not an asset to the public in the aggregate. Thus, with the exception of that part of government debt which is backed by real assets and with the exception of international property interests both ways, the aggregate net worth derived by this method would show the same total as the aggregate of land values and reproducible wealth values. For the purpose of making these minor corrections alone, the immense task seems not to be justified.

5) There has been discussion as to making estimates of so-called 'intangibles'. In *The Institution of Property*, I analyzed this type of property under the heading 'Property in Protected Processes' (p. 451). A glance at these headings will illustrate the difficulty in making such estimates.

Property created by statutory grant or authority

Franchises (true)

Licenses

Patents

Copyrights (statutory)

Trade-marks (registered)

Trade name (special, registered)

Property created by common law right

 Copyrights (common law)

Property created by equitable right

 Trade-marks (not registered)

 Trade names (special, not registered)

Property created principally by contract

 Goodwill

 Memberships in Exchanges

The reasons for believing that the formation of aggregates of intangibles would be a fruitless undertaking are:

a) Such property can be bought and sold. When it is bought, it may be carried at cost. But most of it is never bought, therefore never gets valued and therefore is not included in assets.

b) Even where it has been bought, such property is no longer valued on most private balance sheets. For both these reasons, aggregates taken from actual statements would be so small a part of the actual total that they would misrepresent the facts.

c) It would be impossible to make estimates of the value of intangibles which were not shown on statements. Such value is reflected in a higher rate of income from a given quantity of real wealth. But no estimate of that excess would have validity, since there are other causes of such excess which never appear as intangibles.

These suggestions may be summarized as follows:

a) Segregate the aggregates in the separate sectors. Significance will arise from keeping them separate, not from combining them.

b) The aggregates for the public economy should be divided into two parts: (1) federal government; (2) state and local governments. For each of these, land and reproducible wealth should be kept separate. For these, however, consolidated balance sheets showing net worth will be meaningful.

c) In the private economy, derive estimates of land values

without attempting to separate nonstructural improvements or natural resources.

d) Derive more accurate estimates of the reproducible wealth in the private economy.

e) It seems hardly worth while to undertake consolidated balance sheets of the private economy in order to derive aggregate net worth.

f) It is probably not possible to secure valid estimates of the value of so-called 'intangibles'.

All these suggestions are based on a single scientific principle. If one desires to measure aggregates in a meaningful way, one does not add together magnitudes, some of which are measured by weight, some by length, and some by count.

Simon Kuznets

ELEMENTS OF AGREEMENT

Wealth is a stock of goods designed to facilitate current and future production. In a society that recognizes private property, this stock is the basis for a complex network of claims and obligations by households, firms, and collectives.

We measure wealth by assigning weights to either real goods (physical assets) or claims, because they affect production and economic activity at large. If a stock of goods is indispensable in producing current goods of a certain amount and character, and if it exists in one situation and not in another, we can explain differences between current output in the two situations. Likewise, if for a household, firm, or nation, a complex of claims and obligations makes for a certain pattern of economic behavior in pricing, spending, saving, etc., while another complex, *ceteris paribus*, makes for different patterns, our measures of this complex have important analytical uses.

The purpose of estimates of wealth is to reveal magnitudes of physical assets or of claims because they are determinants of economic behavior—past, present, and future. Therefore, the emphasis on motivation is as relevant to the approach via physical assets as, according to Mr. Hart, it is to the study of the structure of claims. In the former approach the motivation of

economic behavior lies in the relations between the stock and the flow of real goods; in the latter it lies in the relations between pecuniary claims—obligations and economic behavior. Though the two sets of relations may be correlated in some degree, there is no one-to-one agreement. Even though the behavior of a household, firm, or other unit is determined by *both* the physical stock-physical flow and claims-activity relations, it is best to analyze them separately, then combine the analyses and introduce other factors. The physical assets and the claims-obligations (called in my 1938 article, 'On the Measurement of National Wealth', the substantive and the claims) approaches to wealth measurement serve two distinct *proximate* purposes.

Among the issues upon which agreement has been expressed throughout the discussion are: concepts and estimates of wealth should be geared to analytical purposes, not made in such vague terms as 'strength of nations', 'welfare', 'economic power'; estimates by the physical assets approach and the claims approach are suitable for different purposes; and classification should be by groups reflecting the motivation of the economic behavior—past, present, or future—of the households, firms, and collectives that are the active economic units in our society.

The issues upon which disagreement continues are treated under the general heading of inclusion, valuation, and the aggregates.

PROBLEMS OF INCLUSION

Agreement seems to be general that 'human' capital and non-reproducible natural resources not subject to control by human agents, and hence not a basis for a network of transferable claims, should be excluded from any stock of goods or claims. In this I am among the majority; the broader definition of wealth in my 1938 article was designed for the purpose of exploring the area fully, and the conclusions concerning qualifications on estimates geared to this broader concept would obviously call for a much narrower definition. But when we exclude these two items we should be aware that we are restrict-

ing the measurable concept of wealth to a narrowly defined group of factors that falls far short of approximating the productive capacity of a nation or any smaller unit and to a narrowly defined group of claims that falls far short of the complete network of claims exercised by nations, regions, or smaller units vis-a-vis others.

At the other extreme of the range in scope, there is general agreement on the inclusion of all tangible reproducible goods and of all claims connected with them. One possible important exception has been overlooked in the discussion: the stock of war materiel. Its relevance for further production or the direct satisfaction of consumer wants and its role as a basis for claims are highly dubious. However, if we assume that the world is made up of competing nations and that a national economy requires military stocks to function, they should be included in national wealth (even though their current services are best classified as intermediate product, and are not included in national income).

The treatment of two other items is a source of perennial controversy: nonreproducible resources subject to property rights (minerals and the like) and nontangible capital, also subject to property rights (patents, franchises, etc., and goodwill).

That minerals and similar nonreproducible resources facilitate current production is no reason for including them: the same argument applies to rivers, coastlines, climate, etc., which we exclude. But as long as they are subject to property rights a definite argument exists for including them in wealth conceived of as a stock of claims, an argument that holds whether the rights belong to individuals or to a collective (e.g., the state).

Whether they should be included in wealth viewed as a stock of physical assets depends upon how they are valued. If we value, e.g., coal resources by development expenses, or national parks by the expenses incurred to make them fit for use, there would be no question, for we would be including the *reproducible* element of the value of the nonreproducible

assets alone. Difficulty arises only because, on some grounds, the value may be set well above (rarely below) that of work performed in making them available. If we include this excess, the 'nonreproducible' elements of value, why should we not do likewise for other nonreproducible resources of cardinal technological significance (rivers, sunshine, etc.)? If we exclude these resources, do we not omit from wealth elements (particularly if they are subject to private property rights) important in economic activity and whose consideration is important for the analytical purposes stressed above?

However we decide the issue we shall be arbitrary or inconsistent. Admitting the inconsistency and the difficulty of valuation, I prefer to include such resources at their values which well exceed their development costs. The decisive factor is that the resources are subject to property rights, and even when wealth is viewed as a stock of physical assets, the interests of economic analysis compel us to look at the stock not only as an embodiment of the past use of resources but also as one of a complex, subject to allocations by individuals, firms, or collectives. The fact that these nonreproducible resources (in contrast to 'free' resources such as air and rivers) are subject to property rights indicates that they are pieces in the economic game. Therefore, more would be lost in the way of insight provided by wealth estimates if they were excluded than would be gained by being consistent.

The ground for including 'intangibles' is different, even though here also it is simple for the claims approach, and difficult for the physical assets approach. As long as patents, franchises, goodwill, etc. are a basis for claims and, therefore, for corresponding obligations or limitations upon those who do not hold the claims, it is hard to see how they can be excluded from wealth conceived of as a stock of claims. If it is conceded that the specific usefulness of this approach lies in establishing the claims-obligation position of important transactor groups, not in getting nationwide net aggregates, the case for inclusion is irrefutable.

The case for inclusion or exclusion from wealth conceived of

as a stock of physical assets is different. That the items have no physical shape similar to goods that are included is not decisive. If one firm attracts customers by carrying a large inventory of hairpins and another by advertising the superiority of its brand of hairpins, should we include the first firm's larger inventory in the stock of wealth and exclude the goodwill the second firm has accumulated? The input of resources is the same for both firms; the yield to the firms is also the same; and from the standpoint of technical facilities for distribution, viewed for the nation as a whole, there may not be much choice between a large stock of hairpins and the re-education of consumers that would make them satisfied with a small stock. Should we exclude the latter type of capital just because it does not have the physical form of a large inventory or of a machine? A similar question can be raised concerning franchises or patents in which the legal right is evidence of either past input of resources or of a facility indispensable to the proper operation of a productive enterprise.

Such items should be excluded from wealth conceived of as a stock of physical assets for two reasons. First, as far as the intangible does not represent either addition to knowledge or the education of consumers (by means of advertising) but merely a legal privilege, there is no reason why the market value (and it cannot be anything except a market value) of that privilege should be included. It is a means of production for the given firm, but not for society as a whole. Second, as far as the intangible represents an addition to knowledge or the education of consumers, two obstacles to inclusion arise. First, it is extremely difficult to assign values to such additions to knowledge or to education—in no event does the value of the intangible even remotely approximate its real economic significance. Second, and more important, we do not include the much more diverse and in the aggregate much larger accretions to knowledge and capacities of individuals that occur otherwise. It is clearly inconsistent to exclude 'human' capital from wealth and expenses on education from capital formation, and include such dubious items as education of consumers by

advertising. By admitting these types of wealth and capital formation, we lift the lid of a Pandora's box of doubtful items ranging from 'morale', private and public, to the indubitable additions to knowledge and power that are completely outside the range of economic valuation and analysis.

PROBLEMS IN VALUATION

The current value of wealth, properly defined, is the sum of services discounted over the foreseeable future. The argument for weighting the existing wealth items by their current market value, emphasized in Goldsmith's paper and in the comments by Hagen, is compounded of two implicit assumptions: that wealth should be measured in current values; that current market prices are a good approximation to current values. Both assumptions are challengeable.

The first is suspect on the ground that while current values can legitimately be applied to national income, which is a current flow, it is incongruous to apply them to wealth, which is a residue of a long past. To make this argument more concrete, we should consider the question of valuation in the light of the major analytical uses to which the estimates of wealth are likely to be put.

Wealth as a stock of physical assets is of interest to us primarily because it enables us to gauge, in many specific cases (depending upon the classification of both assets and production), the relation between stock and flow. It is one of several productive factors, and from it we can trace differences in the capital-flow ratios among industries or over time. For any given year, additions to capital are in terms of original cost or current market price; existing stock, for comparative purposes, should obviously be at original cost, adjusted for accumulated consumption and differences in price levels. The comparison would then be between the net volume of resources (except nonreproducible resources, of which later) embodied in the existing stock of capital and output, both in current prices. To analyze the stock-flow ratios, is not the valuation suggested, adjusted original cost, the relevant one? And while it uses

market prices (no valuation approach can get away from the market), it employs them to weight the resources embodied in the capital stock. It does not use the current market price of each unit of capital goods as the latter would be derived through a process of sale, except under such artificial assumptions as would equate market price and adjusted original costs.

Only by accident would the adjusted original costs be the current value of capital stock: they are the original cost of capital stock adjusted for past consumption and for differences in price in different periods. To analyze the historical record for the role of technological and economic factors in determining the ratio of capital to current output, the adjusted original cost basis would seem not only adequate but indispensable, for it tells us the magnitude, in current prices, of the actual stock of capital goods being used. As far as current *market* prices of capital goods differ at all from original adjusted cost, i.e., as far as they are not in fact used to approximate the latter, they would distort the ratio for purposes of analysis. Current market prices of most capital goods (physical assets) are a biased sample (usually of distress categories) subject to short term speculative fluctuations that have little to do with either the long term or even short term functions which connect current output with the stock of real factors needed to turn it out.

Granted that for analyzing the *historical* growth of capital and its relation to output, adjusted original cost is the relevant basis of valuation,¹ what is the significance of such an analysis for the future and what can it tell about wealth as at least a partial index of capacity and hence about the future need for capital on varying assumptions concerning prospective output? For such purposes would the current value of wealth not be a more relevant basis? It would call for direct appraisal of possible future yields (productive service) which could then be properly discounted. In other words, when looking into the past the stock of wealth should probably be valued at adjusted

¹ This basis is, in practice, quite close to current reproduction cost (*Studies in Income and Wealth, Volume Two*, pp. 28-33). Adjusted original cost, however, describes the procedure and results better than 'reproduction cost'.

original cost, but when looking into the future, it should be given current value based upon discounting future returns.

This argument is valid. But to apply it properly, one must consider explicitly prospective future services as well as know what pure interest rate to use in discounting. That the current market price of capital goods takes future services into account at a riskless interest rate is a big assumption indeed. I would be inclined to argue that even for the look into the future, the assumption implied in using adjusted original cost is perhaps no more difficult to swallow than the assumption that the current market price equals the true current value of capital goods. Obviously, one could use adjusted original cost for future analysis on the assumption that the past trends or levels of wealth and flow will persist. This would be tantamount to substituting for the judgment of the market concerning the future services of capital and the proper discount rate the judgment of the investigator based upon an analysis of the past. It is not clear to me that the choice must necessarily be in favor of the current market's judgment.

Thus in the physical assets approach, adjusted original cost seems more relevant and expedient; and the current market price basis should be used either as an approximation to adjusted original cost or for nonreproducible goods for which no original costs are, in the nature of the case, available. For the latter, current values are indispensable since as far as no past input of resources is involved, there are no trends or levels of values to project. For these resources analysis must be based upon the past and the current view of the future as expressed by the market—not as recorded by any actual input of resources.

The valuation of wealth as a stock of claims raises an entirely different set of questions. The major analytical purpose is to see how the structure of claims and obligations contributes to different patterns of short and long term behavior of various transactor groups. The magnitudes of some claims and obligations, e.g., cash and other liquid assets, short or long term fixed obligations, are rigidly fixed by their very nature. Since the magnitudes are set, no question of valuation arises. The prob-

lem is with claims and obligations that have no fixed values, and for which some choice exists concerning the basis of valuation; e.g., equity claims and corresponding nonfixed obligations. One would be inclined to say at first that current market prices are the only adequate basis. That the current price could obviously not be realized if *all* such claims were dumped on the market is not relevant: the market is assumed to take care of only the marginal amount of claims that ordinarily change hands, and from the viewpoint of each possessor unit the existence of a market adequate for contingency purposes is the relevant fact. But the market may often fail to perform its function adequately, and its appraisals may not reflect the true long term valuations of claims as viewed by their possessors. Current market prices are therefore a highly equivocal gauge of the claims as conceived by the transactors and as they affect economic behavior. Hence, we may prefer to accept the valuations business firms themselves put upon their equity claims and obligations (e.g., balance sheet values) rather than those of the stock market. Would not such an argument hold for accepting individuals' valuations of their balance sheet items rather than the market judgment as expressed in current market prices?

For claims and obligations whose value is not legally fixed, the valuation important in its effect upon the behavior of holders is a combination of current market price and either prospective market price or prospective yield of the claim. The fluctuating current market price as the sole basis of valuation would not be very revealing. Book values would be meaningful only if they were revised when the future yield or price is expected to change. One may conclude that comparison of values derived from more than one basis of valuation might prove illuminating. At any rate, it seems to me that we are greatly in need of further explicit discussion of the problem.

NATIONAL AGGREGATES

Is there much use for estimates of wealth that exclude 'human' capital and natural resources? Or should we confine ourselves

to estimating physical assets and claims and obligations by relatively narrow categories of users and transactors, and give up national aggregates?

The answer obviously depends upon whether national aggregates have any value except that of sentiment. For wealth viewed as a stock of physical assets, useful purposes are clear. If there is meaning in comparing stocks of goods with current flows by narrowly defined categories, there is meaning in similar comparisons of national aggregates—even though the ratios of the latter are weighted averages of those for the component categories. If our interest in the total output of the economy, as measured by national income, is legitimate, so is our interest in the relation between the aggregate stock of goods and aggregate output. International comparisons or comparisons for one nation in different periods, looking toward an analysis that would explain differences in total and per capita output and factors in economic growth and change, would obviously call for national aggregates of wealth viewed as stocks of goods servicing production—past, current, and on some assumption, future.

In short: to fulfil the various functions of wealth estimates, two national aggregates should be computed. Like any aggregate of wealth viewed as the stock of physical assets at the disposal of a nation, both would be modified by the net balance of claims against foreign countries. One would include all reproducible commodities, stocks held in any and all hands—households, business enterprises, and collectives of various descriptions. The main practical question is the coverage of inventories in the hands of consumers: they ought surely to include durable and perhaps semidurable commodities. The treatment of perishable goods in households is a matter of expediency; they may not warrant the effort involved in adequate estimation.

This total of reproducible wealth would gear in with both net and gross national product—on the assumption that the latter is net of any development expenses and that the former is before the subtraction of depletion charges. The treatment

of the government sector in such product totals has no bearing here: the congruence between reproducible wealth and national product totals would be preserved whether the Department of Commerce assumption, that government activity is all final product, or my assumption, that only direct services to consumers plus government capital formation constitute the final product of governmental activity, is adopted. However, to satisfy the equation mentioned by Mr. Bronfenbrenner (wealth at point 1, presumably valued at adjusted original costs, plus current national product minus current expenditures equals wealth at point 2) the Department of Commerce procedure would require the inclusion under current expenditures not only of personal consumption but also of such government activity as does not constitute additions to government capital.²

The second national aggregate would differ from the first in covering also such nonreproducible resources as are not 'free', i.e., those subject to property rights. It would parallel a national product total which, if gross, takes account of development expenses and additions to nonreproducible resources due to exploration and discovery (over and above development outlays); and if net, excludes depletion allowances. It is quite close to the definitions that were customary before recent changes by the Department of Commerce as far as they deducted depletion charges and ordinarily included among income items gains (corporate or entrepreneurial) associated with discoveries, and corresponds to the variant designated in my 1938 article by SC-I-3. The first national wealth aggregate, excluding nonreproducible resources, is the variant designated SC-I-4 (p. 18 of my article). As already suggested, adjusted original cost is the base for both except that for nonreproducible resources market value must perforce be used. This adjusted original cost may be taken gross or net of accumulated depreciation, depending upon the investigator's confidence in the validity of the data on depreciation and the degree to which

² In the procedure I prefer, current expenditures would include personal consumption and free services from government.

he thinks that such depreciation as is measurable affects the ratio between the capital stock and the flow of current output.

National aggregates can obviously be derived for wealth viewed as a stock of claims; e.g., Hart's net claims of 'ultimates'. However, viewed not as a substitute for a total of physical assets but as an aggregate in its own right, can a total of net claims serve any important uses? Perhaps further exploration of the claims approach would reveal some. At present I cannot think of any. Even if we disregard differences that may result from different bases of valuation, the net claims total would differ from any national aggregate of physical assets in that it would include all intangibles. At present, a national aggregate of wealth as a stock of claims might lead only to confusion.

Part II

Wealth Estimates for Various Sectors

COMMENT

Solomon Fabricant, *New York University and National Bureau of
Economic Research*

E. W. Morehouse, *General Public Utilities Corporation*

Reply by Mr. Kosh

The Agricultural Segment
of the
National Balance Sheet

Roy J. Burroughs
Bureau of Agricultural Economics

Although the author is solely responsible for this paper, much in it reflects the practices, fund of information, and critical evaluations of numerous past and present colleagues in the BAE. Not heretofore published, hence unofficial, are the Balance Sheet for December 31, 1929, all Balance Sheets in terms of constant prices and purchasing power, and the components of the 'real estate' item in each Balance Sheet.

HOW CAN THE BALANCE SHEET OF AGRICULTURE (Table 1) be used as a component of a proposed National Balance Sheet? The purpose of such a National Balance Sheet would be to show the aggregate wealth of the United States in terms of various classes of assets and the distribution of rights, claims, or equities in such assets among the various claimants.

In this paper the farm ownership unit employed in the Balance Sheet of Agriculture is defined, asset and claim items are delineated, and problems of valuation discussed. The principal changes in the Balance Sheet from 1929 to 1939, 1945, and 1946 are indicated in both current and 1939 prices. An income statement for agriculture (Table 2) is presented and the problem of reconciliation with the Balance Sheet considered. Finally, the concluding comments refer to the problem of articulating the Balance Sheet of Agriculture with the proposed National Balance Sheet.

A CONCEPTS

1 *The Ownership Unit*

Agriculture, as conceived in this paper, is the process of producing plants or animals and their products for sale or farm home use, as well as other activities directly incident thereto. This is in keeping with the published bulletins and series of the Bureau of Agricultural Economics known as the *Balance Sheet of Agriculture*.¹ The farming enterprises to which the Balance Sheet of Agriculture applies by implication are engaged not only in producing agricultural products for sale and for home consumption; they also invest in cooperative marketing and credit organizations and in shelter and furniture for the farm family, provide transportation in the farm truck and the family automobile, and manage the financial resources of the operator, including certain funds and some investments not required in farming.² The cooperative organizations them-

¹ Misc. Pub. 567, 583, 620, etc.

² Roy J. Burroughs, 'Consolidated Balance Sheet and Income Statement for Agriculture', *Journal of Farm Economics*, Vol. 27, No. 2, May 1945, pp. 463-72.

selves are not covered in the farm category but investment in cooperatives is regarded as a farming activity in the sense used in the Balance Sheet of Agriculture.

In general, the farming firms covered are those that are identified in the Census of Agriculture. The Balance Sheet analysis views a farm, including part of the household economy, as a business firm. The concept of a farm firm influences most but not all of the data of the Balance Sheet of Agriculture. Inasmuch as the Census definition of a farm has been modified from time to time and its application has varied with the understanding of the enumerators and the interpretations of administrators, complete consistency cannot be expected. However, the "definition of a farm used in the 1945 Census of Agriculture was essentially the same as that used in the 1940, 1935, 1930, and 1925 Censuses".³ Areas of three acres or more in agricultural use, or, if less than three acres, with \$250 or more of agricultural product, are classified as farms. The term 'agricultural operations' covers the usual crop and livestock production and also other activities, such as apiaries, mushroom cellars, greenhouses, nurseries, which are less easily recognized as farms.⁴ The price of products, yield, acreage tilled, etc., by influencing income, determine what may or may not be classified as a farm. In 1945 leased grazing land on the public domain was classed as farm whereas formerly it was classified as open range. Certain lands grazed by authority of a 'permit' are not classified as farms.

The definition of farming in the Standard Industrial Classification is essentially the same as that of the Census.⁵ The 'major groups' of the Standard Industrial Classification which the Balance Sheet of Agriculture is intended to cover are 01, commercial farms; 02, self-sufficiency farms; 03, part-time farms; 04, institutional farms; 05, farm dwellings; and 06, undetermined noncommercial farms.

³ *Census of Agriculture, 1945, 'Definitions and Explanations'.*

⁴ *Ibid.*, Instructions in the Schedule.

⁵ *Standard Industrial Classification Manual* (Bureau of the Budget, 1942), II, 5.

2 *The Asset Items*

The assets of farm enterprises for which the Balance Sheet of Agriculture is an aggregate statement comprise, first, the physical assets used in farm operations such as real estate, livestock, machinery, and crops; second, certain items that are primarily for household or consumption uses such as investment in the house itself, investment in the household furniture and equipment, and investment in the family automobile which is used only in part for production; third, the financial resources of farmers such as currency, bank deposits, United States savings bonds, and investments in farmer cooperative enterprises. Ideally, only certain of such financial assets of farm operators would seem to befit the concept of the farming enterprise as a going concern. Practical considerations in obtaining the data dictate the inclusion of certain financial assets belonging to persons who live on farms whether or not they are farm operators.

Each asset presents a special problem in valuation. Book values of individual farm firms are not available. With the exception of household equipment, the physical assets are valued largely at current market prices as revealed by the Census and other sources. Census base figures are adjusted from year to year by changes in market prices and quantity. Household equipment is valued in terms of estimated average cost from 1936 to 1940 plus purchases each year since, and minus depreciation during each year. Although under some conditions individual farmers might liquidate an investment at something like a going concern value, this would not be possible for agriculture as an industry.

For the economy as a whole or an entire industry, except for rate making or regulatory purposes, it is doubtful that book values, even if available, would be meaningful. If the purpose is to find a measure of national wealth, current market valuations are more significant. Like book values, they reflect obsolescence and depreciation. In addition, they reflect changing demands for products and any other elements that make physi-

cal assets significant to the economy as a whole. Even more important, they reflect changes in the value of money. Book values, which are of significance to the individual firm in calculating costs of production, are of doubtful utility in measuring national wealth, which of necessity must be expressed in a uniform standard of value equally applicable to each form of asset. The valuation basis used in the Balance Sheet of Agriculture is believed generally valid for the purposes intended.

a *Real estate*

The value of farm real estate reported in the Balance Sheet is that for the farms tabulated in the Census of Agriculture adjusted for acreage and value changes at dates when there were no Censuses. For Census dates the value of land and buildings is that reported in the Census. Census enumerators were directed to report 'present market value' and to obtain the 'best possible information'.

For intercensal years, Census base data were adjusted for changes in acreage and by an index of land values per acre prepared by the BAE upon the basis of information from crop reporters and dealers and from surveys by the Bureau and the State agricultural colleges.⁶ The indexes of land values are for March 1, whereas the 1930 and 1940 Census data are as of April 1, and the 1945 Census data as of January 1. To obtain first-of-the-year (last-of-the-year) values, the index for the following March was used.

The Balance Sheet of Agriculture, as published by the BAE, does not distinguish the items, i.e., land, dwellings, and other structures, that comprise 'real estate'. Only from the Census of Agriculture for 1930 can the values of these three components be obtained separately. Even then only the value of operators' dwellings, not the value of all dwellings, was reported. The Census of Agriculture for 1940 reported the value of 'land and buildings' and the value of 'all farm buildings' but did not distinguish dwellings from other buildings. The Census of Agri-

⁶ M. M. Regan and A. R. Johnson, *The Farm Real Estate Situation, 1945-46* (USDA Circular 754, Dec. 1946), p. 2.

culture for 1945 gave only the value of land and buildings together.

The Census of Housing—the only other source for 1940—reported the value (in rental terms convertible to total value) of all rural farm dwellings. However, the coverage differed from that of the Census of Agriculture in that about 500,000 more cases were reported. Moreover, it is said that the values of some rural farm dwellings were not reported separately from the value of the land. To deflate somewhat the excess figures and to make the Census of Housing more comparable with the Census of Agriculture, the 1940 value of dwellings from the Census of Housing was reduced 8 percent for use in the Balance Sheet of December 31, 1939. The value of dwellings was subtracted from the value of all farm buildings as reported by the Census of Agriculture to yield the value of other farm structures as a residual.

The resultant ratio between the value of houses and that of other farm structures for 1940 was 66 to 34. The ratio, as reported by the Census of Agriculture for 1930, was 55 to 45. However, the 1930 Census classified dwellings not occupied by farm operators with other structures. Hence, the figures in the Balance Sheet are not those reported by the Census of Agriculture for 1930. Rather the 1930 values for all farm buildings were divided into the two parts by applying the 66 to 34 ratio. This raised the value of dwellings about 21 percent above the amount reported by the Census and lowered the value of other farm structures about 25 percent. The basic data do not permit consideration of adjustments for differential price movements, if any, of dwellings and other structures.

For 1944, 1945, and 1946 the separation of real estate values into the three components followed the pattern established for 1939 when land was 70 percent, dwellings 20 percent, and other structures 10 percent of the total value of all real estate. The possibility that the three components may have changed in value by differing percentages was not taken into account.

The entire idea of dividing the value of real estate into the values of land, dwellings, and other structures is questionable.

The parts are not properly additive. The farm is a unit for producing income in the forms of dollars, consumable food, fuel, clothing, shelter, and other satisfactions. Improvements are a sunken investment tied to the land. Whether the value is calculated by discounting prospective future income (the discount rate is determined by comparison with alternative opportunities) or by comparison with sales prices of other properties, it is the entire property, not the parts, that must be appraised.

However, for the purpose of analysis as in the Balance Sheet and in other cases, values must sometimes be imputed to the parts to provide a basis for computing aggregate depreciation expense for farming and also a means of distinguishing in their narrow senses the household economy from the farming economy, which in the Balance Sheet are partly merged. Were it possible to compare farms otherwise equal in size and quality but differing in improvements, a market rating of the value of the improvements could be found. The separate valuations would then be additive. Such values determined by market comparisons might depart widely from the accountant's valuation which is based on either original or reproduction cost or on some other base value, minus depreciation. In computing expenses of production the accountant is concerned with valuation for the purpose of prorating the expiration of capital values. When the BAE computes aggregate expenses of agricultural output for ascertaining the net farm income of all farms it figures depreciation by applying a constant factor to the value remaining each year in current prices. Starting from a 1910 Census base value, additions minus depreciation, all in current prices, give year to year valuations from which depreciation expense can be computed. For real property, the values on which depreciation is calculated differ somewhat from the Balance Sheet figures employed here, which were derived by different methods. Depreciation, as computed on a base adjusted for price changes each year, tends to exceed the original investment when prices are rising and to be less than the original investment when prices are falling. Over a long period of

Table 1
Comparative Balance Sheet of Agriculture
December 31, 1929, 1939, 1944, 1945, 1946
(millions of dollars)

	1929 *	1939	1944	1945	1946
ASSETS					
P H Y S I C A L					
Real estate *					
Land	34,930	23,236	32,472	36,480	41,023
Dwellings	8,547	6,914	9,278	10,423	11,721
Other structures	4,403	3,492	4,639	5,211	5,860
Personalty					
Livestock	6,555	5,133	9,012	9,742	11,977
Machinery & motor vehicles	3,302	3,135	6,235	6,195	6,884
Crops					
On farms	2,517	2,339	5,770	5,778	6,823
Off farms, if pledged to CCC	0	306	618	252	28
Household equipment	3,971	4,275	4,232	4,415	4,880
F I N A N C I A L					
Bank deposits					
Demand	1,300	1,500	5,000	6,400	7,500
Time	1,700	1,400	2,500	3,300	3,600
Currency	600	1,000	3,300	4,000	4,000
U.S. savings bonds	0	249	3,702	4,476	4,468
Investments in cooperatives	600	826	1,264	1,420	1,635
Total	68,425	53,805	88,022	98,092	110,399
CLAIMS					
L I A B I L I T I E S					
Real estate mortgages	9,631	6,586	4,933	4,682	4,777
Non-real estate debt					
To main institutions					
Excl. loans held or guaranteed by CCC	2,546	1,538	1,619	1,668	1,955
Loans held or guaranteed by CCC	0	445	683	277	65
To others	2,408	1,455	1,132	1,170	1,500
E Q U I T I E S					
Proprietors' equities	53,840	43,781	79,655	90,295	102,102
Total	68,425	53,805	88,022	98,092	110,399

Derived from the *Balance Sheet of Agriculture, 1947* (BAE).

* The balance sheet for 1929 is unofficial. The estimated values of the components of real estate likewise are unofficial.

rising prices much more than actual investment might be charged off.

Under some conditions cost of reproduction minus depreciation might be near the value obtained by comparison with current sale prices of similar properties if the improvements were entirely in keeping with the farming organization and if they were needed in its future operations. For housing espe-

cially, the investment 'needed' in future operations of the farm would depend upon local attitudes and customs with respect to the standard of housing required. In areas where the standard of living is low, a moderate investment in a house can exceed what the community considers essential, as measured by what people are willing to pay through purchase or rental arrangements. The valuation process is influenced also by the trend of population, the trend toward consolidating farming units into larger operations, the prospective productivity of the land, and other factors.

The use of original cost of farm real estate is obviously out of the question for the Balance Sheet of Agriculture. By using current prices the Balance Sheet more nearly reflects a uniform system of evaluating the assets to the farm firms than would original cost to the individual firms, which would date the valuations variously. In current prices, farm real estate was valued at \$58,604 million on December 31, 1946 (Table 1).

b *Livestock*

The value of livestock on farms is reported in current prices in each Census of Agriculture. For intercensal years the BAE obtains from its field reporters data on changes in the number of different classes of livestock. It assembles data also on farm values of livestock. To multiply the price per head by the number of the different classes of livestock to obtain total asset values in each state is relatively easy. The problems are essentially those involved in any sampling technique. In addition, there is the impossibility of distinguishing changes in the weight and quality of animals on farms. In 1946 at current prices, livestock was valued at \$11,977 million.

c *Machinery and motor vehicles*

For the purpose of the Balance Sheet it is assumed that all motor vehicles are inventoried with the assets of agriculture. The Census of Agriculture was the basis for these inventory values. For intercensal years various estimates were used. The intent was to reflect cost, minus depreciation, adjusted to cur-

rent prices in each year.⁷ The Income Statement charges only a portion of automobile expense to the farm on the assumption that the other portion properly is a consumption item rather than an operating expense.

Although machinery and vehicles too are valued in current prices, this valuation is not as near market prices as the valuations of livestock and real estate. The charge for depreciation, even after adjustment to a current price basis, bears no direct relation to the market discount for used items as compared with new ones. Moreover, had there been any significant change in technology, a current price index of new articles would have been a poor indicator of the changing values of the old. Nevertheless, machinery and motor vehicles are more nearly in current market prices than in any other terms. As of December 31, 1946 they were valued at \$6,884 million.

d *Crops*

The crops of the Balance Sheet are divided into those 'on farms' and those 'off farms'. Crops on farms include primarily harvested hay, feed, grain, cotton, etc., which are stored on farms either free from liens or stored under seal and pledged to the Commodity Credit Corporation or possibly others as security for loans. Some stocks on farms, particularly those of sweet potatoes, apples, and oranges, escape inclusion in the inventory.⁸ Growing crops are not considered in the Balance Sheet except as they may be reflected in the value of real estate.

The only data on farmer-owned stocks stored off farms are those for which warehouse receipts have been pledged by farmers to the Commodity Credit Corporation in connection with nonrecourse price-support loans. In other cases farmers have utilized off-farm storage either with or without warehouse receipts, but the value of such crops is not available for the Balance Sheet.

Farm prices on or near January 1 of each year are the basis

⁷ For a discussion of methods, see the *Impact of the War on the Financial Structure of Agriculture* (BAE, Misc. Pub. 567), App. C, pp. 180-3.

⁸ *Ibid.*, App. B, pp. 178-80.

for appraising stored crops. In current prices harvested crops both 'on' and 'off' farms were valued at \$6,851 million on December 31, 1946.

e *Household equipment*

Household equipment has not been valued in the same way as other physical assets of agriculture and is ultimately to be extensively revised. On the basis of fragmentary data, these estimates reflect cost of furniture and equipment in terms of average conditions between 1935 and 1941 as a base, plus purchases, plus gains or minus losses from movements of population to and from farms, and minus depreciation since 1941. The current market price basis is not used.⁹ The basis is approximately cost. The value of household equipment in current prices is unavailable. The physical amounts of furniture on farms are assumed to change with population. Depending on circumstances from year to year, depreciation may or may not be offset by purchases. Inasmuch as the yearly valuation fluctuates in response to the net influence of depreciation vs. purchases on the one hand and population movements on the other, the annual valuations come reasonably close to reflecting physical changes. For December 31, 1946 the value of equipment was reported as \$4,880 million.

f *Bank deposits*

Farmers' bank deposits have been estimated by the BAE upon the basis of a 1931 survey of deposits in banks extrapolated by an index of deposits in banks in towns of less than 15,000 in twenty leading agricultural states. For the war years adjustments for the amount of government owned war-loan accounts have been made.¹⁰ For demand, but not for time, deposits the Federal Reserve Board has prepared estimates for recent years upon the basis of sampling surveys of deposit ownership in commercial banks.¹¹ For the purpose of the Balance Sheet of

⁹ Ibid., App. D, pp. 183-5.

¹⁰ For methodology see *ibid.*, App. E, pp. 185-95.

¹¹ *Federal Reserve Bulletin*, Vol. 32, No. 11, Nov. 1946, p. 1229.

Agriculture and pending further testing, BAE estimates of demand deposits are arbitrarily adjusted by the Federal Reserve series for the period in which both are available, 1944-47. The two sources are not entirely synchronous but are near enough for the purpose. For neither source is the definition of a farmer spelled out. Consequently, the classification of deposits according to farm or nonfarm ownership is uncertain. Each bank determines whether an account shall be classified as belonging to a farmer. As thus estimated, demand and time deposits of the farm population totaled \$11,100 million on December 31, 1946.

g *Currency*

In the absence of more adequate sources of information it is assumed that the currency holdings of farmers are proportionate to their numbers in the population. The currency holdings of individuals are divided on this basis. On December 31, 1946 currency held by farmers as estimated in this way was \$4,000 million.

h *United States Savings Bonds*

The amount of farmer-owned United States savings bonds was estimated from Treasury sales in numerous sample areas which have a high percentage of farmers. The estimates were based on per capita purchases in such areas and experience with redemptions for the country as a whole.¹² The value of farmer holdings was \$4,468 million at the end of 1946.

i *Investment in cooperatives*

As an adjunct to selling, buying, procuring credit, obtaining insurance, and undertaking other operations, farmers operate a wide variety of business enterprises through the cooperative form of ownership. Farmers' net investments in cooperatives are in the financial assets of the Balance Sheet of Agriculture.

¹² *Impact of the War on the Financial Structure of Agriculture*, App. F, pp. 195-8; see also Alvin S. Tostlebe, 'Estimate of Series E Bond Purchases by Farmers', *Journal of the American Statistical Association*, Sept. 1945.

Marketing and purchasing associations, mutual telephone companies, mutual irrigation companies, mutual fire insurance companies, production credit associations, national farm loan associations, and federal land banks are the chief forms of farmers' cooperative activity. The farmers' financial interest in these selected cooperatives is estimated to have been \$1,635 million on December 31, 1946.

The BAE estimated farmers' investments in these cooperative enterprises from various Census data, files of the Farm Credit Administration, etc. The margin of error is probably smaller for the most recent year than for earlier years. The estimate for December 31, 1929 is not an officially published estimate but is based on an informed judgment.

Farmers' holdings of other forms of investment are not known.

3 *Claim Items*

a *Real estate mortgages*

The aggregate outstanding amount of farm real estate mortgages is estimated from Census reports, sample surveys of borrowers, information from recorders, and certain details from lending institutions. The estimated mortgage debt on December 31, 1946 is \$4,777 million.

FARM-MORTGAGE DEBT BY TENURE UNDER WHICH THE LAND
WAS OPERATED, 1930, 1940, 1945
(millions of dollars)

	1930 ^a	1940	1945
All farms	9,631	6,586	4,933
Owner-operated	5,859	4,459	3,559
Full-owner	4,337	3,353	2,687
Part-owner ^b	1,522	1,106	872
Rented and manager-operated ^c	3,722	2,127	1,373

Farm-Mortgage Debt in the United States: 1945 (Bureau of Census and Bureau of Agricultural Economics Release), Table 1, p. 2.

^a Not strictly comparable with corresponding item for later years.

^b Data are for the portions owned by operators.

^c Data refer to all tenant-operated farms (including croppers), the rented portions of part-owner-operated farms, and manager-operated farms.

Mortgages shown are those on land defined by the Census as farm land. Some mortgages are owed by owner-operators, some

by landlords not living on farms, some by corporations, etc. In 1945 owner-operators owed \$3,559 million and others \$1,373 million on farm mortgages.

b *Non-real estate debt*

Non-real estate debt is divided into the debt to principal lending institutions for which reliable data are available and the debt to miscellaneous lenders including individuals for which the estimate is merely an informed guess. The debt to principal lending institutions is further divided into the debt excluding loans held or guaranteed by the Commodity Credit Corporation and the loans held or guaranteed by the corporation itself. As far as possible, the debts reported are those of individual farmers, not those of farmers' cooperative associations. Since December 1945 banking institutions have been required to make this distinction and to report loans to cooperatives as commercial loans. Until then instructions were not specific, and it is uncertain how the loans to cooperatives were treated.

Loans held or guaranteed by the Commodity Credit Corporation are non-recourse loans which from some points of view are not debts at all. The farmer often views the arrangement whereby he obtains a cash loan at the governmental support price as in fact a sale of the commodity to the government instead of a pledge of the commodity as security for a loan. The commodity will constitute full satisfaction for the note no matter how low the price may fall. Only if the price rises above the support level does the farmer redeem the loan. If he redeems the loan he must pay, within the period stipulated by the government, interest and storage charges to repossess the commodity. If an equivalent portion of the assets, that is, commodities under CCC loans including those in warehouses, were deducted from the asset total, the corresponding CCC type loan could be eliminated also. Some technical difficulties with respect to the difference between the loan value of the commodity and the value as reported by the Crop Reporting Service would have to be overcome but it is believed that such an adjustment could be made.

The loans reported in the Balance Sheet as held or guaranteed by the CCC are intended to be those to individual farmers, not to farmers' cooperative associations. They do involve, and properly so, some loans made by cooperative associations to their farmer members with guarantees by the CCC that it will purchase the loans at any time.

The non-real estate debt 'to others' series has not yet been verified statistically. Such surveys as have been undertaken have not yielded adequate data. The figures used represent the combined judgment of informed individuals and are adjusted from year to year in the light of changes in the amount of other short term and consumer credit.

c Proprietary equities

Proprietary equities are the rights or claims of proprietors in the farming enterprise. Proprietors are those other than creditors having interests in the farming assets: owner-operators, tenant-operators, and landlords. In minor instances corporate or partnership forms of ownership are represented, and to a considerable extent, rights of local, state, and national governments are involved, but precisely how far has not been ascertained. See, however, Reuss' paper, which gives information concerning governmental holdings of various types of land in terms of acreage.

The Balance Sheet of Agriculture, December 31, 1939 (January 1, 1940), is considered in some detail in this connection because of its close relation to the 1940 Census which has been analyzed more intensively than the 1945 Census. The creditor interest in the Balance Sheet on December 31, 1939 was 19 percent, leaving 81 percent for the proprietary interest. The proprietary share of the landlords, based on landlords' holdings of real estate only and not including whatever interests the landlords may have had in non-real estate assets, was about 23 percent. For the southern cropper areas, where regional data desired, such an omission would distort the picture badly; for the country as a whole the omission is less serious. However, the interests of farm operators in land they rent to others are in

landlords' holdings. The equities of landlords and owner-operators in real estate assets can be computed readily from *Farm-Mortgage Debt in the United States: 1945*. The operators' equity in non-real estate assets can be computed roughly from the Balance Sheet. The computed equities in all farm assets for December 31, 1939 are \$53,805 million.

DISTRIBUTION OF EQUITIES BY CLASSES OF HOLDERS,
DECEMBER 31, 1939

EQUITY HOLDERS	EQUITIES	
	Millions of dollars	%
Landlords	12,653	23
Operators (owners and tenants)	31,128	58
Creditors	10,024	19
Total	53,805	100

Some portion of the amount attributed to operators should be transferred to the landlords' imputed share and vice versa but there seems to be no basis for computing the net influence of such transfers. Landlords owned considerable livestock, crops, and machinery ascribed to operators. No allowance has been made for the holdings of non-operators who live on farms and have financial assets, household furniture, automobiles, etc.

Distribution of the operators' equity between owner-operators and tenants is uncertain. The equity of owner-operators in real estate totaled \$14,402 million, not including land rented to others. The total equity of owner-operators and tenants in non-real estate assets, including assets of non-operators living on farms, was \$16,726 million on December 31, 1939 (January 1, 1940). Tenants constituted about 39 percent and owner-operators about 61 percent of all farm operators. If 61 percent of non-real estate assets is imputed to owner-operators and added to their equity in the real estate operated by them, the total equity of owner-operators would be \$26,701 million; the equity of tenant-operators \$7,864 million. It is believed, however, that owner-operators had an even larger portion and tenant-operators a smaller portion of non-real estate assets than their respective numbers would indicate. In 1940 over 67 percent of the value of machinery and equipment was on owner-

operated farms; 64 percent of the value of land was operated by owners. Surveys of liquid assets, which are a part of non-real estate assets, have revealed a rather high degree of inequality in holdings.¹³ It is believed that tenants would more commonly be among those who hold smaller amounts of financial assets. However, BAE surveys show that in some areas tenants have, or at least report, larger amounts of liquid assets per family than owners.

B BALANCE SHEET WITH PHYSICAL ASSETS IN CONSTANT PRICES

The assets and corresponding claims of the Balance Sheet of Agriculture totaled over \$110 billion on December 31, 1946; they were less than \$54 billion on December 31, 1939 and \$68 billion on December 31, 1929. These marked changes are accounted for principally by wide variations in the prices by which the physical assets were valued and changes in the holdings of financial assets. It is instructive to consider a balance sheet from which all changes in assets directly attributable to variations in prices from January 1, 1940 have been removed (Table 2).

1 *Physical Assets*

Physical assets in 1940 prices increased from roughly \$48 billion at the end of 1929 to somewhat under \$51 billion at the end of 1946, or less than 6 percent; in current prices of each year they increased 39 percent. Between 1939 and 1946 physical assets in 1939 prices increased from nearly \$49 billion to less than \$51 billion, or 4 percent; in current prices they increased 83 percent. Between the end of 1939 and the end of 1946 the value of livestock and of machinery and motor vehicles in 1939 prices increased. A decrease in the value of crops reduced the increase in the three items combined to about 10 percent. In one sense these three types of physical inventory may be said to have increased in physical amount when taken as a group. Some persons regard a tractor, for example, as having a constant physical quantity until it is retired; that is, they do not

¹³ *Balance Sheet of Agriculture, 1946* (BAE), pp. 30 and 31.

Table 2
Balance Sheet of Agriculture with Physical Assets Valued at
December 31, 1939 Prices
December 31, 1929, 1939, 1945, 1946
(millions of dollars)

	1929	1939	1945	1946
ASSETS				
Real estate	33,642	33,642	33,642	33,642
Non-real estate				
Livestock	5,217	5,133	5,402	5,162
Machinery & motor vehicles	3,398	3,135	3,912	4,333
Crops stored on & off farms	1,578	2,645	2,523	2,528
Household equipment	3,971	4,275	4,415	4,880
PHYSICAL				
Deposits & currency	3,600	3,900	13,700	15,100
U.S. savings bonds	0	249	4,476	4,468
Investments in cooperatives	600	826	1,264	1,635
Total	52,006	53,805	69,334	71,748
FINANCIAL				
CLAIMS				
Real estate mortgages	9,631	6,586	4,682	4,777
Non-real estate debt				
To main institutions				
Excl. loans held or guaranteed by CCC	2,546	1,538	1,668	1,955
Loans held or guaranteed by CCC	0	445	277	65
To others	2,408	1,455	1,170	1,500
LIABILITIES				
EQUITIES				
Proprietors' equities	37,421	43,781	61,537	63,451
Total	52,006	53,805	69,334	71,748
Unofficial.				

admit that deterioration represents the expiration of a physical amount. Since the power produced remains substantially unchanged, why not the physical quantity? I, however, consider that physical quantity may for some purposes be viewed as expiring with the use of the equipment in the production process.

a *Real estate*

Farm real estate was valued at \$47,880 million on December 31, 1929, \$33,642 million on December 31, 1939, \$52,114 million on December 31, 1945, and \$58,604 million on December 31, 1946. The increase from 1939 to 1946, 74 percent, was due primarily to changes in the prices at which the real estate was valued.

The expression of real estate values in 1939 prices gives a constant figure for each year covered. Although small changes in the physical characteristics and quantities of the real estate inventory no doubt occurred, data are insufficient to measure them. Acreage in farms has fluctuated slightly. Soil has been depleted and buildings have depreciated yet there have been such offsets as new buildings and improvements, soil improvement programs, and electrification of farm buildings. For the purpose of this paper, such changes as have enhanced or depressed values in constant prices are assumed to offset one another. Hence the December 31, 1939 value of \$33,642 million was used throughout the period covered. Likewise, the value of the components of real estate—land, dwellings, and other structures—was assumed to remain constant at the 1939 level.

b Other physical assets

Livestock values were reduced to a 1939 basis by multiplying the number of animals of each species on farms in each year by the value per head on the base date. Any differences in quality and weight of livestock are reflected in the farm value per head.

Crops were adjusted to a 1939 basis by using BAE indexes of farm prices for all crops. The values of household furniture and equipment, on the other hand, were reported in 1935-41 prices when possible but no attempt was made to adjust year to year purchases to a common price level.

Machinery and motor vehicles were adjusted to a 1939 basis by applying unpublished price indexes to each class: automobiles, motor trucks, tractors, and other farm machinery. The indexes were for new equipment except that for automobiles indexes for prices of both new and used cars were used. During the war, machines and vehicles not only increased in number but were used more intensively and the newer models performed more efficiently than the old. Agriculture became increasingly mechanized in terms both of number and use of machines.

2 *Financial Assets*

The second major reason for the changes in the footings of the Balance Sheet is that the value of financial assets has changed a great deal. The financial assets reported in the Balance Sheet are unadjusted for changes in purchasing power. Financial assets pay debts dollar for dollar regardless of purchasing power. Although unadjusted in the Balance Sheet, changes in the relative position of farmers can be better understood by considering the results of deflating financial assets to a constant purchasing power. Whether expressed in current valuations or converted to a dollar of constant purchasing power, financial assets showed large gains.

The problem of converting bank deposits and other liquid assets into 1939 values differs from that for physical assets. For physical assets the process is mainly one of multiplying physical quantities for any given year by prices of December 31, 1939 or of using some index. To financial assets, especially bank deposits and currency, no price tag can be attached. Bank deposits and currency represent generalized purchasing power. The question is how the generalized purchasing power in any given year compares with the purchasing power the same number of dollars would have had in 1939. For farmers, this can be determined in a general way by referring to the index of the prices of articles farmers buy, maintained regularly by the BAE. The ratio of this index in any given year to the index for 1939 would provide the basis for deflating the purchasing power of bank deposits to the 1939 basis. Thus for 1945 the index stood at 150.8 and for 1946 at 185 (1939:100). For example, the deposits and currency owned by farmers on December 31, 1945 were estimated to be \$13,700 million. In purchasing power these \$13,700 million represented to the farmer only 9,085 million 1939 dollars. The \$15,100 million of deposits and currency held by farmers on December 31, 1946 represented only 8,167 million 1939 dollars.

3 *Liabilities*

The debt associated with agriculture dropped steadily from an estimated \$14,585 million on December 31, 1929 to \$10,024 million in 1939, and \$7,797 million in 1945. In 1946 liabilities reversed their trend; on December 31, 1946 they were \$8,297 million.

The liability items in the Balance Sheet of Agriculture were not adjusted for changes in price levels. For balance sheet reporting, it can be argued that debt is a contractual obligation and should be reported only in contractual dollar amounts. From the legal point of view, this is correct; also, this approach leaves the proprietary equity with a definable meaning. Liabilities reported in the Balance Sheet were the contractual obligations for the respective years.

But liabilities may be interpreted in other ways. One may say that if assets are adjusted to a common price base, the debt-asset ratio becomes distorted unless debt too is deflated in some way. Hence it could be argued that mortgage debt, for example, should be considered in relation to the value of real estate and that the relation between deflated values and deflated debt should be the same as between current values and current debt. This approach would emphasize the significance of the real estate as security for the debt and would show the amount of real estate, valued in the prices of the base year, that would have to be sold to pay the debt.

Another possibility would be to deflate both debt and financial assets by the same index, i.e., the exchange values of the two items to a common base. However, a debt has exchange value to the lender rather than to the borrower. The lender is not directly concerned with the prices the farmer pays, the index required for reducing liquid assets to a 1939 base.

Further, with respect at least to mortgages, the amount of contractual debt in a given year may be adjusted so that the burden of the debt service can be compared crudely with that of the base year 1939. On December 31, 1939 total mortgage

debt was \$6,586 million and on December 31, 1945, when debt was lower than a year later, it was \$4,682 million, indicating a reduction of the legal obligation. However, the economic burden of the debt service to the farms on which it fell was reduced more than is indicated by the legal amounts of debts. Between the end of 1939 and of 1945, prices paid by farmers for commodities increased from an index of 122 (1910-14:100) to 184, or 51 percent; the index of prices received by farmers increased from 99 to 206, or 108 percent. As compared with the base years 1910-14, when the ratio of prices received to prices paid was 100, the parity ratio, as this may be called, was 81 at the end of 1939 and 112 on December 31, 1945.¹⁴ The 1945 parity ratio is 138 percent of the 1939 parity ratio; that is, relative to prices paid by farmers, prices received by farmers were 38 percent higher at the end of 1945 than at the end of 1939.

If prices received relative to prices paid are higher in a given year than in a base year, other things being equal, the service on the debt load is lighter. To compare the loads for debt service it is only necessary to adjust the debt in any given year by the ratio of that year's parity ratio to the parity ratio of the base year. For example, the mortgage debt of \$4,682 million on December 31, 1945, when divided by 138, the ratio of parity ratios, becomes \$3,393 million. The dollar debt decreased from \$6,586 to \$4,682 million, or 29 percent, whereas the relative burden for debt service decreased from \$6,586 to \$3,393 million, or 48 percent.

Conceptually it is possible to balance financial assets against debts. Financial assets represent claims of agriculture against the rest of the economy and debts represent the claims of other sectors of the economy against agriculture. The net position of agriculture with respect to the rest of the economy is indicated by the algebraic sum of the two items. If only the net balance or net obligation were shown in the Balance Sheet, this ap-

¹⁴ The published ratio of the Department of Agriculture given this title is the ratio of prices received to prices paid including interest and taxes. As employed here the parity ratio does not reflect interest and taxes.

proach would be possible, but in that case the amounts of financial assets and of debts would not appear as individual items.

C RECONCILIATION OF INCOME STATEMENT WITH BALANCE SHEET

The comparative income statement for agriculture 1940-46 reveals clearly the upward sweep of income received by agriculture during the war years (Table 3). The Income Statement does not have precisely the same coverage as the Balance Sheet. It does not include depreciation on household furniture and equipment as an expense whereas the Balance Sheet includes the furniture as an asset item. It includes only the farm portion of the cost of operating motor vehicles, usually 40 to 50 percent, whereas the Balance Sheet represents the full value of the family automobile among the assets. It does not include earnings on financial assets reported in the Balance Sheet. In most other particulars the two statements seem to be consistent. In practice, year to year deviations in consistency may occur because of the difficulty of obtaining the same coverage for the estimates of the two types of data.

The preceding section has indicated the extent to which the increases shown in the Balance Sheet represent 'real' gains and those that are merely a writeup of assets consequent upon price changes. It remains to consider the relations between the two types of statement and to attempt a reconciliation of the cash items of the Income Statement with the Balance Sheet. For illustrative purposes the seven years 1940-46 were chosen.

The years of high income have influenced the Balance Sheet of Agriculture both directly and indirectly. Directly, some of the income has accumulated in the form of various assets, particularly financial assets. Indirectly, the high income received during and since the war and the income prospects for the future, based in part on the prospective government support of prices of agricultural commodities, caused a bidding up of valuations of income-producing farm property.

Table 3
Comparative Income Statement for Agriculture, 1940-1946
(millions of dollars)

	1940	1941	1942	1943	1944	1945	1946
	D E R I V A T I O N O F N E T I N C O M E						
1 Cash receipts from farm marketings	8,366	11,190	15,389	19,459	20,371	21,517	24,860
2 Value of products retained on farms for home consumption	1,254	1,460	1,781	2,149	2,192	2,257	2,624
3 Rental value of farm houses	624	658	702	755	820	889	978
4 Total gross income from agriculture	10,244	13,308	17,872	22,363	23,383	24,663	28,462
5 Feed bought	998	1,089	1,625	2,137	2,427	2,845	3,031
6 Livestock bought, except horses & mules	478	602	802	778	688	870	1,051
7 Fertilizer & lime bought	261	292	352	423	476	510	621
8 Vehicle operation	568	633	735	851	942	1,010	1,024
9 Depreciation & maintenance	1,096	1,233	1,402	1,576	1,867	2,069	2,210
10 Interest on non-real estate debt *	212	235	230	198	181	188	208
11 Other operating expenses	637	699	890	1,022	1,098	1,130	1,263
12 Taxes on real estate & tangible personalty	446	457	461	472	495	554	617
13 Total nonlabor production costs	-4,696	-5,240	-6,497	-7,457	-8,174	-9,176	-10,025
14 Adjustment for changes in inventory ^b	+96	+374	+928	+536	-402	-439	-19
15 Total net income from agriculture	5,644	8,442	12,303	15,442	14,807	15,048	18,418
16 Government payments *	+766	+586	+697	+672	+804	+769	+772
17 Total net income from agr. & govt. payments	6,410	9,028	13,000	16,114	15,611	15,817	19,190

	D I S T R I B U T I O N O F N E T I N C O M E					
18 Hired labor (cash & perquisites)	1,020	1,238	1,626	2,009	2,184	2,536
19 Farm family labor	a	a	a	a	a	a
20 Operators' labor	a	a	a	a	a	a
21 Total return to labor	a	a	a	a	a	a
22 Net rent & govt. payments to landlords not living on farms *	460	656	964	1,135	1,194	1,255
23 Farm mortgage interest	293	286	272	246	236	216
24 Capital return to operators	a	a	a	a	a	a
25 Total return to capital	a	a	a	a	a	a
26 Total return to operators ‡	4,637	6,848	10,138	12,724	11,997	15,183
27 Total net income from agr. & govt. payments	6,410	9,028	13,000	16,114	15,611	19,190

Based on 'Net Farm Income and Parity, 1940-46', *The Farm Income Situation*, BAE, June 1947, and subsequent revisions.
The margin of error varies with the items. All data are preliminary.

* Includes an allowance for interest on an indeterminate amount of miscellaneous debt.

† Market value, in end of year prices, of the increase or decrease in the quantity of crops for sale on farms or of the number of livestock whether or not for sale.

‡ Includes some payments that are comparable with certain items included in item 1; e.g., receipts from loans made or guaranteed by the CCC are included in item 1, whereas wartime consumer price subsidies to dairy and other farmers are included in item 16.

a Unavailable.

* After subtraction of estimated payments for taxes, mortgage interest, and other expenses paid by such landlords.

‡ Reflects the adjustment for changes in inventory values and represents the difference between item 17 and the sum of items 18, 22, and 23.

Table 4
Net Cash Income of Farm Operators, Cumulative, 1940-1946
(millions of dollars)

Government payments	5,066
Cash receipts	121,152
Total receipts	126,218
Cash operating expenses	39,812
Hired labor	10,784
Rent, etc.	6,857
Interest on mortgages	1,761
Total expenses	59,214
Net cash return to operators	67,004

RECONCILIATION WITH INCOME STATEMENT

Depreciation expenses	-11,453
Value of products retained	+13,717
Rental value of houses	+5,426
Perquisites to labor	-2,128
Inventory adjustment	+1,074
Total adjustment	+6,636
Total return to operators	73,640

During 1940-46 farm operators received net cash receipts estimated to be \$67,004 million (Table 4). These figures do not include cash wages of farm laborers living on farms, \$7,334 million, net income from nonagricultural sources of persons living on farms, \$24,760 million, or interest on farm mortgages received by operators who are also mortgagees. How did this income affect the Balance Sheet (Table 5)? Estimated debt payments, excluding about one-third of mortgage debt assumed to have been paid by nonoperators, were about \$1,151 million. Increases in holdings of United States savings bonds and equities in cooperative associations totaled about \$5,028 million; increases in currency and deposits owned by the farm

Table 5
Cash Reconciliation Statement, Cumulative, 1940-1946
(millions of dollars)

Net cash returns to operators from agriculture	67,004
Cash outlays, total	31,231
Purchases of buildings & machinery	11,962
Net debt payments (by operators)	1,151
Net purchases of stocks & bonds *	5,028
Federal income taxes	1,890
Increase in currency & deposits	11,200
Unallocated	35,773

* Net purchases of United States savings bonds and of stock in farmers' cooperatives.

population about \$11,200 million. Besides these cash outlays and accumulations affecting assets and liabilities, the Balance Sheet was influenced by replacements and additions to buildings and machinery, cash expenditures for which totaled about \$11,960 million, and by similar outlays for furniture and household equipment, totals for which are lacking. Farm families paid also perhaps as much as \$1,890 million in federal income taxes as well as substantial state taxes—amounts that obviously could not accumulate in the assets. The remaining cash received by farmers was undoubtedly used for living expenses and other transactions. A substantial amount is known to have been used to purchase land from insurance companies, federal land banks, and other nonfarm owners. The total unallocated cash for the period is about \$35,773 million, not including the nonagricultural income or the cash wages of farm laborers.

D ARTICULATING THE BALANCE SHEET OF AGRICULTURE WITH THE NATIONAL BALANCE SHEET

It is not easy to articulate the Balance Sheet of Agriculture with balance sheets for other sectors of the economy for the purpose of preparing a National Balance Sheet. The assets which, on either theoretical or practical grounds, should be assigned to each sector and not duplicated in the process of consolidation, are difficult to define in many marginal cases. The claims involve much overlapping. The rights of one sector of the economy in the rights of another sector that has claims to the assets of a third sector are intermingled in various ways.

The concept of a consolidated balance sheet entails the elimination of intra-accounting-unit claims. The end product on the asset side includes only physical assets and claims against those outside the accounting unit. On the claims side it includes only the claims not pledged to others within the accounting unit. For example, the stock of a subsidiary held by a parent corporation cancels out in the consolidation. Only the stock of the subsidiary held by stockholders outside the accounting unit, plus the stock of the parent corporation held by stock-

holders outside the accounting unit, can be said to represent the consolidated equity. In contrast, the Balance Sheet of Agriculture was not corrected for these intra-agriculture claims. Debts of one farmer to another are included as though they were claims of other sectors of the economy against agriculture. The obligations to principal lending institutions are on the record and are clearly defined. However, a very considerable margin remains in the case of both mortgage and nonmortgage debt in which the type of lender is uncertain.

Mr. Reuss' paper indicates some of the points of interrelatedness of the Balance Sheet of Agriculture with other sectors of the economy. With respect to assets, when is land to be classified as farm, forest, grazing, or other? Much farm land is in woodlots, much grazing land is within the Census definition of farm land. Farm land is usually considered to include subsurface as well as surface rights. However, much farm property is leased to oil companies and other exploiters of mineral assets. How can the assets be disentangled and not counted more than once?

Claims are even more difficult to disentangle. Farm land is owned by the federal government, by state and local governments, by credit institutions, manufacturing enterprises, forest operators, and others.

Farm firms and farm households seem to be unavoidably and permanently entwined in the Balance Sheet of Agriculture and would remain so in a National Balance Sheet. Farm bookkeeping systems often attempt to differentiate between farming and household or consumption activities. However, farming is so much a way of life and so little an independent business apart from the total family activity that fine points of distinction are hard to make. The Balance Sheet of Agriculture includes the investment in the farmhouse, furniture, and equipment, and the family automobile as assets of the agricultural enterprise. The Income Statement includes taxes, insurance, repairs, and other costs arising from the investment in the farmhouse as a part of the expense of agricultural production. This is the practical approach. In one sense the farm family is

a charge on the farm no matter what the cost of maintaining the family. It is desirable to distinguish between the farm and the operator and between the farm as a business and the household as an accounting unit, but data seldom permit a distinction.

The Balance Sheet of Agriculture is merely a first step in the process of social accounting in the field of agriculture. Future refinements will take two directions: those which refine the quality of the aggregate asset and claim estimates for all agriculture and those which provide distributions of operators and farm firms according to size of investment, net worth, location, and other significant classes. The wealth invested in agriculture as an industry is imposing in the aggregate and constitutes an important segment of the national wealth but as long as individual farm firms operate, the aggregate as well as the parts must be considered. Only a social accounting that can give sufficient weight to both the aggregates and the parts will be adequate for providing measures of the welfare and wealth of the American economy.

Since this paper was written, a few changes have been made in the procedures for preparing some of the data used in the Balance Sheet of Agriculture. Demand deposit figures are now exclusively those of the Federal Reserve System. Each year a sample of commercial banks is surveyed by the Reserve banks to obtain information concerning the ownership of deposits of individuals, partnerships, and corporations. The adoption of Federal Reserve data has considerably reduced the reported level of farmer-owned demand deposits. The time deposits in the Balance Sheet continue to be those of the BAE. No current banking surveys of the ownership of time deposits are available.

Redemptions of United States Savings Bonds, Series 'E', are now estimated from data reported by the Treasury for the same sample counties as used in estimating purchases. Only re-

demptions of other series of savings and government bonds continue to be estimated from the experience for the country as a whole.

The BAE now publishes a balance sheet similar to that of the deflated one of this article in which physical assets are valued at 1940 prices. Financial assets and liabilities remain undeflated for price changes.

Land Utilization Data as Background Information
for the National Balance Sheet and
Approximations of the Value of Forest Lands

Lawrence A. Reuss

Bureau of Agricultural Economics

THE OBJECTIVES OF THIS PAPER ARE TWOFOLD: to present statistics on the major types of use and ownership of land in the United States and approximations of the value of forest and woodland by ownership classes. The former is intended as background information to show the place of private and public lands, land in farms and not in farms, in the total ownership and use pictures, thereby serving as reference material in integrating estimates of the value of various types of land reported by various ownership and use classes. The latter is designed to meet more directly the needs of the National Balance Sheet. Whenever possible, overlapping areas of ownership, use, and value are indicated.

A SOURCES OF DATA

Historically, the collection of land utilization statistics was begun by the Department of Commerce, with the Census of 1850. Farm land was enumerated as 'improved' or 'unimproved'. In three decades the agricultural enumeration was modified only slightly. However, the Census Act of 1879 provided for a more elaborate collection of statistics, and in 1890 and in later Census years schedules were expanded and revised.

After the turn of the century various land utilization statistics were collected by branches of the Department of Agriculture, such as the Forest Service and the Crop and Livestock Estimating Service of the Bureau of Agricultural Economics. Other contributions to the literature on this subject were made by numerous agencies, state universities, and individuals.

From the viewpoint of land utilization, major emphasis has been upon the collection of statistics on crops—acreage and kind. The Census has been the primary source of data concerning land in farms in Census years. Statistics for land not in farms have been less complete and have included studies of individual items by interested agencies; for example, estimates of forest land acreage by the Forest Service, public domain lands by the Department of the Interior, and studies of local areas by federal, state, and private agencies and individuals.

During the 1930's studies by the National Resources Planning Board and similar agencies contributed greatly to statistics on total land utilization. Since 1920 the Bureau of Agricultural Economics has prepared periodic inventories of land use and in more recent years several production adjustment studies.

Statistics on the utilization of land in farms in 1929, 1934, and 1944 (Tables 1 and 2) are almost entirely from the Census. 'Total farm land' in all years is from the Census, as are 'total land area' and 'total nonfarm land'. Uses not reported by the Census and modifications in Census data are based largely upon studies by the Department of Agriculture, including those on forest and grazing land, and upon charts, maps, records, and reports of various federal and state agencies.

Nowhere is a complete record kept of both the ownership and the use of the nation's land. To do so would require comprehensive inventories periodically. The estimates of ownership in Tables 3-5 were compiled from many federal and state reports and records—publications of the various federal departments, such as Agriculture, Interior, Commerce, War, and Navy, as well as reports of many state agencies administering state lands or concerned with the assessment and taxation of land. The totals are not complete or fully comparable in all respects, but indicate the general size of holdings.

Noncensus sources of land utilization and ownership statistics include the following:

Department of Agriculture:

Agriculture Yearbook

1915, 1921, and 1932

'Our Forage Resources', by C. V. Piper et al (1923), pp. 311-414

'Utilization of Our Lands for Crops, Pasture and Forests', by L. C. Gray et al (1923)

'Soils and Men' (1938)

'Our Major Land Use Problems and Suggested Lines of Action', by L. C. Gray (1940), pp. 398-415

'Climate and Man' (1941)

Agricultural Statistics, published annually (Government Printing Office)

A Graphic Summary of American Agriculture, Misc. Pub. 105 (1931)

A Graphic Summary of Physical Features and Land Utilization in the United States, by O. E. Baker, Misc. Pub. 260 (May 1937)

A Graphic Summary of Farm Crops, by O. E. Baker and A. B. Genung, Misc. Pub. 297 (March 1938)

Bureau of Agricultural Economics: *Federal Rural Lands*, by L. A. Reuss and O. O. McCracken (June 1947; multilithed)

Forest Service: *Gaging the Timber Resources of the United States* (1946)

United States Congress:

A National Plan for American Forestry, Senate Doc. 12, 73d Cong., 1st Sess. (1933)

The Western Range, *Senate Doc. 199*, 74th Cong., 2d Sess. (1936)

Federal Ownership of Real Estate and Its Bearing on State and Local Taxation: Report of a Special Federal Real Estate Committee, *House Doc. 111*, 76th Cong., 1st Sess. (1937)

Public Lands, Tax Problems, etc., *H. R. Report 1884*, 78th Cong., 2d Sess., Sept. 14, 1944, and *H. R. Report 5*, 80th Cong., 1st Sess. (Jan. 3, 1947)

National Resources Board:

A Report on National Planning and Public Works in Relation to Natural Resources and Including Land Use and Water Resources with Findings and Recommendations (1934)

Supplementary Report of the Land Use Planning Committee (1935)

Annual reports of various governmental agencies, including the Chief of the Forest Service, Commissioner of the General Land Office, Chief of the Soil Conservation Service, Secretary of the Interior, and reports of various state officers administering state lands or concerned with the assessment of land for taxation.

A History of Public Land Policies, by B. H. Hibbard (Macmillan, 1925)

Land Economics, by R. T. Ely and G. S. Wehrwein (Macmillan, 1947)

Our Landed Heritage, by R. M. Robbins (Princeton University Press, 1942)

B DEFINITIONS

Land utilization and ownership terms as used in this paper are defined as follows:

'Cropland' includes cropland harvested, crop failure, and cropland idle or fallow, as shown by the Census of Agriculture.

'Nonforested pasture and range land' includes nonforested pasture and grazing land, whether plowable or not.

'Grazing land' includes nonforested pasture and range land and forest and woodland grazed.

'Forest and woodland', as defined by the Census, includes grazed and ungrazed "Farm wood lots or timber tracts, natural or planted, and cutover land with young growth, which has or will have value as wood or timber".¹ Chaparral and woody shrubs were omitted.

As defined by the United States Forest Service, 'commercial forest land' includes "land capable of producing timber of commercial quantity and quality, and available now or prospectively for commercial use"; 'noncommercial forest land' includes lands "such as oak-cedar breaks of Texas and Oklahoma, mesquite, pinon-juniper in the West, chaparral in southern California, remote and inaccessible alpine ranges, and other areas which appear to be permanently out of the commercial timber-producing class because of low productivity or extreme inaccessibility".²

'Other land' includes 'service' areas, such as urban areas, highways and roads, railroad rights-of-way, farmsteads, farm lanes, parks, game refuges, and airports; also lands having slight surface use value except for wildlife and watershed protection and recreation (desert areas, rock, sand dunes, swampland, etc.). 'Total land area', as defined by the Census, includes "dry land and land temporarily or partially covered by water, such as marshland, swamps and river flood plains . . ." (except tidal flats) ". . . streams, sloughs, estuaries, and canals less than 1/8 of a statute mile in width; and lakes, reservoirs, and ponds having less than 40 acres of area".³

'Private land' is land held or owned by private individuals, groups, or corporations, and is generally used for private purposes.

¹ Bureau of the Census, *United States Summary, Agriculture* (First Series, 1940), p. 4.

² 'Basic Forest Statistics for the U.S.—as of Beginning of 1945—Preliminary Data from the Reappraisal Project' (Forest Service, July 1946).

³ Bureau of the Census, *Areas of the United States, 1940*, p. 2.

'Public land' is land owned or held by federal, state, county, municipal, or other governments for common or public purposes. Public land usually includes Indian lands held in trust by the government and administered for the benefit of the Indians.

C THE LAND AREA

In the continental United States are about 1,905 million acres of land—industrial centers, cities, towns, seaports, villages, corn belt farms, cotton farms, dairy farms, ranches, irrigated valleys, timberlands, rocky mountain tops, deserts, swamplands.

Agricultural uses are principally three—pasture, crop, and forest. Sometimes land uses are competitive, sometimes complementary. Often forest land is used simultaneously for timber production and for grazing. The dividing line between certain types of land use is not everywhere clear-cut. For example, classifications of nonforested grazing land and desert land differ because in periods of favorable rainfall grazing tends to expand into areas usually too dry for use. Further expansion and progress in land inventory and classification will be necessary before all differences in classification can be entirely reconciled.

Cropland accounts for approximately 403 million acres, or over one-fifth of the land area. In addition, about 109 million acres are in plowable pasture, making a total of about 512 million acres cultivable for crops.

Open (nonforested) pasture and range land occupies 707 million acres, 37 percent of the land area of the United States, and constitutes the largest single item of land use and one of the nation's greatest and most essential land resources. All grazing land, open and forested, accounts for over a billion acres, or 55 percent of the entire land area. Though distributed throughout the country, over half is in the 17 western states. Livestock and livestock products produced in large part on pasture and other grazing lands are among the country's leading agricultural commodities.

Some 624 million acres are classified on the basis of cover

types as being 'forest land'. This includes commercial timberland, some open land prospectively available for commercial timber production and noncommercial woodland. However, some of this land has been withdrawn from timber cutting and is enclosed in state and national parks, military reservations, and other preserves. The withdrawn area has been estimated, for purposes of land utilization studies, to be 14 million acres and is included as 'other land' or as 'service areas'. In addition, some of this woodland and brushland, estimated to be 8 million acres, has apparently been classified by the Census as 'non-forested pasture land in farms'. After making these deductions for purposes of land utilization studies, some 602 million acres of forest land are *available for timber production*.

Of the total area having forest cover, over half is grazed. Only about 20 percent of the 461 million acres of commercial forest land remains in old growth timber. Of the other 80 percent, a very large part is not fully productive. Heavy cutting, fire, insects, and diseases have made heavy inroads, and have left much land poorly stocked.

Other uses of land include sites of cities, rural residential and industrial areas, farmsteads, roads, railroads, ditches, parks, wildlife sanctuaries, and military and naval sites; also deserts, rock, sand dunes, swamps, etc. having slight surface use value except incidentally for watershed and wildlife protection and recreation. There is some indication that since 1929 acreages of cropland and forest land have declined slightly, of 'other' land increased (Table I).

Table I
Trend in Major Land Uses, 1929, 1939, 1944
(millions of acres)

	1929	1939	1944
Cropland (see Definitions)	413	399	403
Nonforested pasture and range land	708	723	707
Forest and woodland ^a	607	602	602
Other	177	181	193
Total land area	1,905 ^b	1,905	1,905

Preliminary, subject to revision.

^a Forest and woodland outside of parks, military reservations, etc.

^b Complete remeasurement made in connection with the 1940 Census.

1 *Land in Farms and Not in Farms*

Extensive conversion of nonfarm pasture land to farm pasture land and increases in land in farms are evident from Table 2. Commenting upon the increase in land in farms in the Mountain States from 1939 to 1944, the Bureau of the Census states: ⁴

⁴ 'Preliminary Compilation of Number of Farms and Acres in Farms in the United States, by Counties: 1945 Census of Agriculture', Bureau of the Census, Nov. 30, 1945, p. 1.

Table 2
Uses of Land in Farms and Not in Farms, 1929, 1939, 1944
(millions of acres)

	1929		1939		1944	
	In farms	Not in farms	In farms	Not in farms	In farms	Not in farms
Cropland	413	0	399	0	403	0
Pasture & range land (non-forested)	379	329	461	262	529	178
Forest & woodland (excl. parks, etc.)	150	457	157	445	166	436
'Service' areas	25	40	29	49	29	71
Military lands ^a	0	4	0	5	0	25
Highways & roads ^b	13	6	15	5	15	5
Parks ^c	0	10	0	16	0	18
Urban areas ^d	0	12	0	13	0	13
Farmsteads ^e	8	0	10	0	10	0
Game refuges ^f	0	4	0	5	0	5
Railroad r.o.w. ^g	2	2	2	2	2	2
Farm roads & lanes ^h	2	0	2	0	2	0
Airports ⁱ	0	1	0	1	0	1
Other service ^j	0	1	0	2	0	2
Land having slight surface use value	20	92	15	88	15	78
Total land area	987	918	1,061	844	1,142	763

Preliminary, subject to revision.

^a *Federal Rural Lands*. Military lands minus military airports.

^b Unpublished tabulation of the Soil Conservation Service, 1941.

^c National Park Service lands from *Federal Rural Lands*. State park land from unpublished tabulation of the Soil Conservation Service, 1941.

^d Estimated by F. J. Marschner, BAE. Area of places with populations over 100 in Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, South Dakota, and Vermont; area of places with populations over 1,000 in all other states.

^e Estimated by BAE.

^f Federal lands administered by Fish and Wildlife Service, Department of the Interior.

^g From tabulation by Interstate Commerce Commission, Jan. 1947.

^h From tabulation by Department of Commerce, Civil Aeronautics Administration.

ⁱ Miscellaneous federal lands, experimental farms, etc.

"Much of this reported gain in Mountain States land in farms probably is due to inclusion of grazing lands not previously reported as land in farms. To this extent, the increased acreage reflects changes in the control of the land and not increased agricultural activity. Public domain grazed under permit and open range neither owned nor leased by those using such range are not included as farm acreage, but when such land passes into private control through lease or purchase, it is counted as farm acreage.

The 1945 Census includes as farm acreage more Indian grazing land, due to changes in the method of enumerating agricultural activities on Indian reservations. In previous censuses, much of this grazing land was not counted because it was considered open range . . ."

The shift from nonfarm to farmland reflects, therefore, both agriculture development and a change in classification.

2 *Land Ownership*

Though the lion's share of the land of the United States, nearly 70 percent, is privately owned, nearly 560 million acres are administered by federal, state, and local government agencies combined. However, much public land is used by local farmers and ranchers for grazing; it is just as agricultural as neighboring private lands similarly used.

Among the significant changes in land ownership since 1929 have been the shift of pasture and range from public to private ownership and the increase in publicly owned 'service areas' (parks, game refuges, military land, highways, etc.). The decline in publicly owned land having slight surface use value is attributed in part to the creation of game preserves, recreation areas, and military reservations in desert areas, and in part to the development of water sources by deep wells, etc. Although the area of publicly owned grazing land has declined, the amount of such land reported in farms has substantially increased (Table 3).

Table 3
Approximate Ownership of Land, 1929, 1939, 1944
(millions of acres)

	1 9 2 9		1 9 3 9		1 9 4 4	
	Private	Public	Private	Public	Private	Public
			A L L	L A N D		
Cropland	409	4	396	3	398	5
Pasture & range land	434	274	476	247	455	252
Forest & woodland	431	176	393	209	402	200
'Service' areas	24	41	27	51	27	73
Military	0	4	0	5	0	25
Highways & roads	0	19	0	20	0	20
Parks	0	10	10	16	0	18
Urban areas	9.5	2.5	10.5	2.5	10.5	2.5
Farmsteads	8.	0	10	0	10	0
Game refuges	0	4	0	5	0	5
Railroad r.o.w.	4	0	4	0	4	0
Farm roads & lanes	2	0	2	0	2	0
Airports	0.5	0.5	0.5	0.5	0.5	0.5
Other service	0	1	0	2	0	2
Land having slight sur- face use value	61	51	61	42	63	30
Total	1,359	546	1,353	552	1,345	560
			L A N D I N F A R M S			
Cropland	409	4	396	3	398	5
Pasture & range land	340	39	433	28	455	74
Forest & woodland	137	13	144	13	145	21
'Service' areas	12	13	14	15	14	15
Highways & roads	0	13	0	15	0	15
Farmsteads	8	0	10	0	10	0
Railroad r.o.w.	2	0	2	0	2	0
Farm roads & lanes	2	0	2	0	2	0
Land having slight sur- face use value	20	0	15	0	15	0
Total	918	69	1,002	59	1,027	115
			L A N D N O T I N F A R M S			
Pasture & range land	94	235	43	219	0	178
Forest & woodland	294	163	249	196	257	179
'Service' areas	12	23	13	36	13	58
Military lands	0	4	0	5	0	25
Highways & roads	0	6	0	5	0	5
Parks	0	10	0	16	0	18
Urban areas	9.5	2.5	10.5	2.5	10.5	2.5
Game refuges	0	4	0	5	0	5
Railroad r.o.w.	2	0	2	0	2	0
Airports	0.5	0.5	0.5	0.5	0.5	0.5
Other service	0	1	0	2	0	2
Land having slight sur- face use value	41 ^a	51 ^b	46 ^a	42 ^b	48 ^a	30 ^b
Total	441	477	351	493	318	445

The totals should be regarded as approximations of the acreages of land held privately and by public groups and in the different uses rather than the results of a detailed enumeration. All data are preliminary, subject to revision.

^a Total private land having slight surface use value (except for watershed and wildlife protection and recreation) minus land having slight surface use value in farms.

^b Same as total public land of slight surface use value.

3 *Public Land in Farms and Ranches*

Public land as usually defined includes the 57 million acres held in trust or otherwise administered by the federal government for the Indians. Much of this land is reported by the Census of Agriculture as in crop, grazing, and forest use in farms and ranches. A large part of the state land is suitable for grazing and is leased to farmers and ranchers and reported as land in farms. In addition to Indian and state land, probably 15-20 million acres of federal land leased outright or covered by use permits issued to individual farmers and ranchers are reported in farms. Land reported in farms by farmers and ranchers includes, especially in the areas of rectangular survey, lands used for public highways and roads. About 115 million acres of publicly owned land are now included by the Census of Agriculture as land in farms and ranches. Detailed study may raise or lower this estimate; however, a substantial acreage of public land is known to be reported as in farms and ranches.

4 *Character and Use of the Public Land*

The best of the public domain lands was disposed of through homestead, mining, timber, and other Congressional acts, including allotments to Indians, grants to states and railroads, withdrawals of watershed areas for national forests, setting aside parks and wildlife sanctuaries, reservations for reclamation of suitable valley areas, flood control, national defense, and other federal purposes. With minor exceptions, the remaining public domain lands are in the 11 Rocky Mountain and Pacific states, mainly in regions where the normal annual rainfall is less than 15 inches—a fact that largely accounts for their still being in the hands of the government. Large areas are rough and broken, frequently containing much sand and bare rock and having other desert-like characteristics.

Altogether, the federal government administers for various public purposes about 408 million acres of original public domain land and 50 million acres of acquired land (Table 4). In addition to these 458 million acres administered by the fed-

eral government, state and local governments control a tentatively estimated 102 million acres (a gross approximation subject to change). Most of the state land was originally public domain land granted to the states for public purposes. Much of it is now used for grazing and forestry. Some land has been acquired for special purposes, such as water supply areas, wildlife preserves, parks, forests, and institutional needs. Additional areas have reverted to states and local governments because of nonpayment of taxes.

Table 4
Federal Rural Lands, 1945

	Millions of acres
National forests (set aside for protection & conservation of watershed & water supplies, growth & protection of timber & other public purposes)	157.9
National parks, monuments, & wildlife refuges	18.3
Reclamation lands	9.9
Submarginal land use areas	7.5
Military areas	25.1
Indian reservations & other lands held in trust for benefit of Indians	56.6
Grazing districts	140.1
Residual area of public domain (mainly reserved for leasing & exchange purposes & for sale & entry when in the public interest)	40.3
Other federal land	1.9
Total acreage administered by the federal government	457.6

Federal Rural Lands.

D APPROXIMATIONS OF THE VALUE OF FOREST LAND

Some 624 million acres are classified on the basis of cover as being 'forest land'. As mentioned above, some is in parks, military reservations, and other preserves; and some woodlands and brushlands have apparently been classified by the Census as 'nonforested pasture land in farms'. According to the recent reappraisal of forest resources by the Forest Service, *Gaging the Timber Resources of the United States*, there are 461 million acres of commercial and 163 million acres of noncommercial forest land.

The 1946 value of all land having forest or woodland cover has been estimated by the Forest Service to be \$8 billion (see Memorandum). Immediate sale of all forest land and timber

FOREST LAND

	Commercial	Noncommercial (millions of acres)	Total
Federally owned or managed	89	88	177
National forest	73	50	123
Indian reservation	7	10	17
Grazing service	1	16	17
Other	8	12	20
State	18	10	28
County & municipal	9	1	10
Total public	116	99	215
Farm woodland	139	27 ^a	166 ^b
Industrial & other private	206	37 ^c	243 ^c
Total private	345	64	409
Grand total	461	163	624

Gaging the Timber Resources of the United States and unpublished tabulations of the Forest Service, except as indicated in notes a, b, and c.

^a Difference between total forest and woodland in farms as shown by Census of 1945 and commercial farm woodland as shown by Forest Service reappraisal.

^b *Census of Agriculture, 1945.*

^c Residual items.

for commercial use is assumed. It was not deemed possible without considerable research to give in detail the value of forest land by various claimants. However, values were established for 'public', 'farm', and 'other private' forest lands as \$2.4, \$1.8, and \$3.8 billion, respectively. All farm forests were assumed to be privately owned. The value of roads, logging equipment, etc., and public values for watershed protection, recreation in the forested portions of parks and in other forest areas, power sites, wildlife, etc. were not included.

The value of all forest land was estimated to be \$5.4 billion in 1939 and \$5.6 billion in 1929. 'Public' forest land was valued at \$1.3 billion and 'farm' forest land at \$1.2 billion in both 1929 and 1939. 'Other private' forest land declined in value from \$3.1 billion in 1929 to \$2.9 billion in 1939.

In 1939 dollars, 1929, 1939, and 1946 values of all commercial forest land were \$5.85, \$5.4, and \$4.8 billion, respectively; of 'public' forest land, \$1.35, \$1.3, and \$1.2 billion; of 'farm' forests, \$1.2, \$1.2, and \$1.1 billion, and of 'other private' forest land, \$3.3, \$2.9, and \$2.5 billion.

E NONFORESTED PASTURE AND RANGE LAND OUTSIDE OF FARMS

Estimates presented above indicate the existence of about 178 million acres of nonfarm public grazing land that is not included in the valuations set by either the Balance Sheet of Agriculture or the forest land valuations. This is properly a part of the land assets listed under 'government'. As far as is known, no adequate survey has been made to determine the value of this land in dollars and cents. In the *Annual Report of the Director of the Grazing Service*, fiscal year ended June 30, 1945, it was assumed that the 144 million acres of grazing land in the custody of the Grazing Service had an average value of \$1.25 an acre for soil and forage, or a total of \$179 million. Assumptions were also made concerning values for watershed purposes (\$144 million); woodland and forest (valued at 50 cents a cord, or a total of \$115 million); range improvements (residual value \$10 million); and special uses (\$52 million). However, this valuation is not based on a 'market value' concept and includes an estimated 18 million acres of forest and woodland. Soil, forage, and range improvement values would probably be the major factors in establishing the market price of the nonforested range land.

F OTHER NONFARM LANDS

The land utilization estimates presented above indicate the existence of some 149 million acres of 'other' land not in farms. Included are 71 million acres of 'service' lands and 78 million acres of 'land having slight surface use value'. Forest lands withdrawn from timber cutting, and included in 'service' areas (parks, military lands, etc.)—estimated to be 14 million acres—were included in the value of all forest land estimated by the Forest Service. The balance of the nonfarm 'service' areas (about 57 million acres) includes some 13 million acres of urban land and some 44 million acres of military lands, highways and roads, parks, game refuges, airports, and miscellaneous service areas, largely in public ownership.

COPY

MEMORANDUM

Washington 25, D. C.

FOREST SERVICE

September 19, 1947

To: V. Webster Johnson, Chief, Div. of Land Economics
 Bureau of Agricultural Economics
Attention: Lawrence A. Reuss

From: Edward C. Crafts, Chief, Division of Forest Economics

By: H. R. Josephson, Acting

Subject: RE-PRICES-Forest Values

In accordance with discussions with Messrs. Reuss and Burroughs, we have prepared estimates of the market value of forest lands in the United States for the years 1946, 1939 and 1929 which are shown in the attached table. These estimates were prepared for use by a committee of which Mr. Copeland of the Federal Reserve Office is chairman.

As indicated in a footnote to the attached table, these estimates are tentative and preliminary. They are based on a rather narrow concept of market value, which assumes immediate sale of all forest land and timber for commercial uses. Hence, the figures do not include certain large public values, value of roads, logging equipment, etc., nor the value of range lands, which are often closely associated with forest lands. The breakdown of value between public, farm and other private categories of ownership is believed to be of less reliability than the figures for total value of all forest lands.

Attachment

/s/ H. R. Josephson

COPY

*Estimated Market Value of Forest Land in the United States,
 1946, 1939 and 1929¹*

Year	Public	Farm	Other Private	Total
		(million dollars)		
1946 value	2,400	1,800	3,800	8,000
at 1939 prices	1,200	1,100	2,500	4,800
1939 value	1,300	1,200	2,900	5,400
1929 value	1,300	1,200	3,100	5,600
at 1939 prices	1,350	1,200	3,300	5,850

¹ Preliminary estimates. Figures assume immediate sale of all forest land and timber for commercial uses. Figures do not include (1) large public values in water production, recreation, wildlife, etc.; (2) value of improvements, equipment, etc.; and (3) value of nonforest range.

Subsoil Wealth

H. Foster Bain et al

Consulting Engineer, Bureau of Mines

The material on copper is the outcome of conversations with S. P. Hatchett and J. A. Grimes of the Internal Revenue Bureau and members of the Bureau of Mines and Geological Survey. The section on gold was prepared by F. M. Chace of the Geological Survey, and the introductory material by Mr. Bain. Estimates for bituminous coal were calculated in discussion with W. H. Young of the Bureau of Mines, Coal Economics Division. The figures on petroleum and natural gas were prepared by E. B. Swanson of the Oil and Gas Division, United States Department of the Interior. The iron ore estimates were based on talks with E. F. Burchard, formerly of the Federal Geological Survey, and engineers in the iron ore industry.

Mr. Bain died in March 1948. The Executive Committee of the Conference on Research in Income and Wealth wishes to thank E. W. Pehrson for reviewing the editorial changes in Mr. Bain's paper.

SUBSOIL MINERALS CONTRIBUTE SUBSTANTIALLY to the annual income of the United States, not only as sources of energy but also as raw materials of industry. In 1929 the approximate value of mineral output totaled \$5,887,600,000. In 1939 it had fallen slightly—to \$4,874,000,000—but in 1946 it reached a peak of \$8,900,000,000. Through many years, the mineral industries have grown rapidly, even at an accelerating rate. Between 1899 and 1939 output from mines and quarries increased more than twice as much as that of agriculture and almost as much as manufacturing. Fuels and nonmetals increased most; but production of metals, though growing faster than agricultural output, fell behind manufacturing. The indexes of production, taking the output for 1899 as 100, were metals, 224; fuels, 430; other nonmetals, 382; total, 366; manufacturing, 374; agriculture, 159.¹

Are we, as a nation, overproducing and exhausting our resources at a dangerous rate? The matter is vital because the mineral industries do not have a perennial base for operations, being dependent on irreplaceable mineral deposits. Thus mining, in contrast to manufacturing and agriculture, is a wasting asset industry. It is, then, all the more important to measure, if possible, total deposits and determine the place of subsurface minerals among the assets of the nation. Though, for many reasons treated in greater detail below, such an estimate is necessarily imperfect, it has been felt worth while to make such a start as may be possible at this time in full recognition of the difficulties of the problem and the incompleteness of any result likely to be attained.

The work falls naturally into two stages: first, estimating the amounts of the various minerals known to exist in the ground; second (for purposes of comparison and for fitting the results into a national balance sheet), evaluating these known reserves. Only the known reserves, or at most those reasonably to be expected to be produced within a period in which the present worth of the dollar is significant, can be covered. Probably

¹ *The Mining Industries, 1899-1939*, Barger and Schurr (NBER, 1944), Table 1, p. 14.

there are large quantities of minerals in the ground that at some future time will come into use; but if knowledge concerning them is so indefinite that they cannot be measured, no tangible value can now be assigned to them. Moreover, if they cannot be produced and marketed within some reasonable period, say fifty years, their present worth is so small that their omission from the balance sheet will not materially invalidate the results. To see far into the future is as difficult as to see far into the ground, and any attempt to determine what may be true more than one generation or, at most, two ahead may well be as harmful as helpful. In the actual process of buying and selling, estimates of mineral reserves are usually based on supplies for 20 to 25 years or, at the highest, 50 years, not only because many unknown factors influence production and price but also because the present worth of future profits decreases as the years accumulate. The present value varies with the interest rates assumed; ² at 5 percent compounded annually, a dollar that will not be received for 20 years has a present worth of only 38 cents. If payment is deferred 30 years, the present value decreases to 23 cents, if to 40 years, to 14 cents, and at 50 years it becomes as little as 9 cents. Since money that can earn 5 percent and be compounded at the same rate will double itself in 15 years and even if it earns only 3 percent will double in 24 years, to put one's money in a savings bank or insurance annuity may obviously be more profitable than to invest it in the risky business of mining.

The United States Department of the Interior has recently completed, through the joint activities of the Geological Survey and the Bureau of Mines, a general summary of estimates of the amounts of the various mineral resources in the ground, taking into account present standards of quality and methods of production. This has been presented to Congress and published as the appendix to a Congressional document.³ Though

² See e.g., tables in *Mine Examination and Valuation*, Baxter and Parks (Michigan College of Mining and Technology, 1939).

³ *Investigation of National Resources*, Hearings before a Subcommittee of the Committee on Public Lands of the United States Senate, 80th Cong., 1st Sess., May 1947.

the most comprehensive statement of ore reserves yet made, its limitations must be understood in order to avoid misinterpretation. Only ores and mineral deposits workable under conditions similar to the present were considered. If the cost of wages, supplies, and taxes rises and the price of the product is not raised correspondingly, known reserves may well become unworkable, as has already happened in the case of many gold mines, such as the great Alaska-Juneau. Technological progress will often narrow the gap between cost and price, though probably not in the instance cited, as both technology and the scale of operations seem to have already been pushed to the limit to reduce costs. Advances in technology have, however, so far proved the most effective safeguard for the future; many a mine after having been worked for years has shown a larger reserve than at the beginning, not only because more ore of the same grade has been found but also because better methods have made it possible to work ore of a grade previously deemed not workable. Notable illustrations abound in the so-called 'porphyry copper' deposits, where rock has been converted into ore by improvements in technology, administration, and financing on an enormous scale. Our country would be really starved for copper if only the grade of ore worked at the beginning of this century could now be mined at a profit. In the last decade of the 19th century, it was considered notable that ores containing as little as 5 percent copper could be profitably mined; but for some years much of the copper mined has been won from ores containing less than 1 percent. In large mines the 'cut-off point', or that below which the material mined is sent to the waste dumps rather than the mill, has been 0.4 percent copper. In some mines at certain times it has been even lower. The statement that our known reserves will supply us for only a certain number of years at present rates of production is a yellow warning, not a red, and the green light may not be as far away as even the next corner.

Sometimes for technical and at other times for financial reasons, it is not always advisable to develop ore reserves too far ahead of the market. The great Mother Lode of California has

produced gold in quantity for almost a century, yet it is doubtful that measurement of the ore reserves in sight would often have shown more than a two years' supply ready for mining. The principal reason has been that, under conditions on the Mother Lode, it is frequently difficult and expensive to hold a drift for more than two years without retimbering. As this operation is expensive, opening ground too far ahead of actual mining is wasteful and is not done. Actually the operating companies have instead relied upon experience—they will be able to open more ground as rapidly as it becomes needed. Although there have been disappointments and some losses, the policy has on the whole proved wise. A small ore reserve therefore does not necessarily mean a short life for a mine. Only for special reasons, such as determining whether to invest large sums in reequipping a property, introducing a new method, or obtaining a larger position in some projected combination, is it customary to do more than a minimum of advance development. It is, though, not beyond a miner to dress up a mine for sale even if that does not conduce to maximum ultimate profit from the property.

Under other conditions, such as hard, firm walls or small pumping expense, it may well be that financial reasons, such as security for large investment, may make it sound to carry a larger ore reserve, measured in terms of the known life term of the mine. For example, in the Homestake, the largest American gold mine, physical conditions permit holding ground open at small expense; the occurrence of the ore is such that to be sure of reserves it is important to know in advance as much as possible about the ground to be opened up, and the heavy investment makes security important. So it has been the general policy of the Homestake Company to keep approximately ten years' ore supply developed ahead. The advantages in this case outweigh the disadvantages, such as the accumulating interest charge on the money spent on advance development and the risk of excessive taxation in a region where only a small fraction of the voting population is engaged in mining.

The danger of excessive taxation is one a prudent mine man-

ager must constantly keep in mind in planning development. The sporadic distribution of ores, the general belief that ore deposits are treasure troves to the major part of which society as a whole is entitled, and the increasing pressure on tax authorities to produce additional revenue, render mines especially vulnerable from the taxation point of view, and many and diverse types of tax have come into being. It is not easy to determine a just tax on mines or on minerals in the ground, but the disposition of the authorities to tax everything in sight naturally leads mining companies to put as little ore in sight in advance of mining as possible. This, in turn, adds to the difficulty of determining how much national wealth is underground.

The experience of the Minnesota mining companies is probably as well documented as any. In this state lie the largest iron ore reserves of the United States, and records are available for more than thirty years. The mines are in a small section of a large state dominated by agriculture; the voting power of the miners is small compared with that of the wheat farmers. The Department of Taxation has wide authority and a competent staff of engineers and accountants who use accepted methods in calculating the ore reserves. Nonetheless, there are loud complaints against the amount of taxes collected, particularly those taken by county and local authorities, with charges of extravagance and waste in local government in consequence of the ease with which money can be raised by taxing the mines. The matter is of national interest, since little ore is used in Minnesota and any addition to the price due to taxation is borne by the people of the entire country who buy iron and steel products. The Department of Taxation collects both ad valorem and occupation taxes and collects from both the mining company and the royalty owner.

As of May 1, 1945 total ore in the ground was calculated to be 1,034,300,000 tons. The assessed valuation was placed at \$129,306,000 or 12.5 cents per ton in the ground. On this there were collected in 1945 \$20,600,432 in taxes, made up of \$6,249,985 occupation tax, \$1,762,134 royalty tax, and \$12,-

588,313 ad valorem (\$1,019,654 in state, \$3,291,772 in county, and \$8,276,887 in local taxes). The ore shipped totaled 62,830,-572 tons, and the tax collected came to \$0.328 per ton *shipped*, not per ton *assessed*. The amount of taxes collected per year has remained fairly steady for twenty years; and, as shipments have varied greatly, the taxes paid per ton shipped have also varied, rising steeply in depression years when shipments were small. In 1932 the taxes collected amounted to \$7.348 per ton; and the average sale price of Minnesota hematite ore, calculated back to the mine, was \$2.79.⁴ These figures would seem to be largely responsible for the fog that clouds the public mind with doubt concerning the adequacy or inadequacy of the Lake Superior iron ore reserves for the safety of the United States. Actually there are many excellent reasons for expecting a much longer life term for the Minnesota iron mines than that calculated by dividing the known reserves by the expected requirements each year.⁵ The crucial factor is the ratio between the rate of use and the rate of discovery, including additions due to improvements in technology. These factors will be discussed in more detail in connection with the valuations proposed below. In a general way, it may be stated that many mining corporations, having once opened and equipped their mines, try to direct exploration so as to replace by discovery an amount of ore equal to that mined in each year or short period.

To place a dollar value on the subsoil resources of the continental United States for the purpose of drawing up any balance sheet of assets and liabilities, several assumptions must be made. It is, for example, assumed that what is desired is the fair market price at the date of the valuation; in this case 1929, 1939, and 1946. This can only be 'as is, where is', or in the ground, since any other price will necessarily include reimbursement for goods and services, to mention merely two items necessary to produce the goods and transport them to the point of sale. These are not to be regarded as part of the value of the

⁴ *Minerals Yearbook* (Bureau of Mines, 1932-33), p. 185.

⁵ See 'Iron Ore Supply for the Future', W. O. Hotchkiss, *Economic Geology*, May 1947; and 'The Iron We Need', C. B. Randall, *Atlantic Monthly*, June 1948.

resource itself. Because only an insignificant portion of any mineral resource is ever carried in stock as part of the live inventory of industry, the ore must be valued in the ground.

A fair price implies the usual assumption of a willing seller and a willing buyer, but in each instance the parties to the transaction review possible alternatives. The farmer, asked to sell the mineral rights in his land or to give a lease for purposes of mineral development, compares the amounts promised to or realized by other farmers for similar rights, while the would-be lessor will consider whether he can buy or lease equally good land elsewhere on better terms.

As the subsurface resources of the country, even those of significant minerals, are much too large for any single purchaser or syndicate to handle, their value can be estimated only by applying to the whole the values fixed by representative transactions or by indirect methods. The first method is based on royalties, the second on calculations of the margin of probable profit.

Mining engineers and mine valuers have developed a well founded system for working out the value of individual mines, deposits, or tracts of land. Since it is to be presumed that the purpose of a valuation is to fix a price for a transfer at a specific time and since in most instances that time is the present, most valuations are directed to finding the present value of the property, though for special purposes an earlier or later value may be taken. For tax purposes the value of the property at the time any specific law went into effect—such as March 1, 1913—is important, but in any event returns to be realized only in the future are discounted to find the equivalent present value. To do this, it is necessary to determine or estimate the quantity of recoverable ore in the ground, the rate of profit that may be made per unit, and then from considerations of market and of capital to be invested, the rate at which these profits may be realized. From these data the rate and amount of the annual returns can be determined. These are then discounted to present value, and the sum is taken as the value of the property. Obviously the crucial data are the profit per unit, the rate at

which the profits accrue, and the number of years they will continue. This scheme for determining the present value of future profits or, more probably, the present value of expected future profits, is frankly based upon the profit motive, since we live and work in a profit economy.

The spread between the sale price of a product and the cost of production to that point must of course be enough to cover the value to the landowner of the material in the ground and the risk and use of money necessary to induce the investing public to finance the venture. When mineral properties are leased, the landowner accepts an agreement that either a certain proportionate share of the product as produced will be delivered to him, as is usual with petroleum or, as is more common with coal, iron, and other minerals, he will receive a cash price per ton or other unit as it is produced. Alternatively, the operator may buy outright either the fee to the land or to the mineral rights, the owner retaining the surface rights; or the landowner, having given a lease on a royalty basis, may sell his royalties to third parties. In the petroleum business there is a wide open market for royalties, which often sell for as much as or more than the lease itself. The landowner's one-eighth, not being burdened with costs of production, at times is estimated to be as valuable as the lessor's seven-eighths, which have to assume the costs of development and production for the whole. Incidentally, in mineral mining of various kinds it is not uncommon for the landowner's value to be estimated (as above) at one-half the expected net profit from the enterprise.

The time it takes to produce the mineral is important in determining its value. The sooner a placer miner can get the gold out of his ground and put it to work earning interest, the more valuable is it to him. Other things being equal, it is more profitable to equip the ground with a dredge that can work the area in ten years than with one that would take twenty; and, within limits, the same rule applies to equipping lode mines. In the late 'nineties one of our ablest mining engineers calculated that most profit could be made from a given area in the Rand (Africa) if the mine in it was equipped for a life of

fourteen years than if for a longer or shorter time. Many factors enter such a calculation but in all, time is important. When a large amount of material is available, for example, limestone, sand, and gravel, the market mainly fixes the price, profit, and scale of output. There is no profit in opening mines or quarries with capacities exceeding the market for the product. Only the portion of the total reserve in the ground that can be marketed within the time that a dollar to be received in the future has an appreciable present worth is of any value—at least any value that can be stated in dollars. Such is the basis on which mineral properties are bought and sold.

That there are special risks inherent in the vagaries of deposits of ores and other minerals is generally accepted, and venture capital alone is attracted. To induce entrepreneurs to take these risks, the expected rate of return must be somewhat higher than in other fields of investment. Dry holes cost as much as producing wells, and the risks of unexpected changes in size, position, and grade of ore in a deposit are numerous and real, justifying the demand for a rate of return higher than that on a tax exempt bond or a public utility security in a growing industry. Through many prewar years mines were valued on a basis of an expected 8 to 12 percent on the investment plus return of capital, it being realized that, however large dividends might be, there was an offset to profit if a capital loss resulted. In 1929, one of the years chosen for this study, an ore deposit would have been valued on the basis of expectation of at least an 8 percent annual return on the capital, plus a sinking fund which, invested at 4 percent compound interest, would accumulate a reserve within the life of the mine that would equal the capital invested. In more recent years, interest rates have fallen, but it is doubtful that much money can be had for mining if less than an 8 percent return is expected, although sinking funds could hardly be set up at present on more than a 3 or 3.5 percent basis.

As has been indicated, engineers base valuations upon expected profits from exploitation. Admittedly, this is only one method of evaluation, and there may be other unrevealed val-

ues; but this is the accepted way to measure the present values of the known reserves at a particular time.

The profit, or value of a ton of ore in the ground, may be worth more under one management than another. If the attempt is made to measure the value of ore in the ground by royalty rates, these may, unless well established throughout an industry (as in the case of petroleum), reflect mainly the relative bargaining powers of the parties concerned. Finally, while the value is determined by the nearness of the date of production and that date may be so far off there is no present value that can usefully be expressed in figures, the existence of ore beyond that having a present worth gives an insurance value for continuity of operations. At least one large steel company bought iron ore lands years ago beyond the amount having at that time any reasonable present worth. It did, however, usefully ensure the company's future supply beyond the fifty years or so that might well have been taken as a basis of value, as well as its capacity to expand production beyond the point then appearing probable. Overbuying to some moderate extent, then, is justifiable to ensure future production, and has proved worth while in other instances too. But an owner of mineral lands can be as land-poor as a farmer. The carrying charges on the investment may and often do lead to losses rather than profits.

This situation has been true in the anthracite industry, where the cost of undeveloped reserve lands has hung like the proverbial millstone around the neck of the mining companies. In this instance, early buying was less for insurance than in the hope of creating a monopoly. Economic law brought penalties greater than any that might have been imposed by antitrust legislation; moreover, the economic law was self-enforcing and not subject to repeal.

Nations are expected to live longer than individuals or corporations, and to them security is of primary importance. Therefore, in setting up the value of subsoil mineral resources as an item in the balance sheet of national wealth, should some allowance not be made for their social value? Goodwill, which

can seldom be measured in dollars and cents, is commonly entered in a balance sheet, if at only \$1; why not some of these other items? How about underground water, so essential to life and industry but which, even when sold, is merely passed on at the cost of production? How about the water in our harbors and navigable rivers? They are useful; do they not have value?

At present it can be said only that there is no known system of valuing them although, if enough study is devoted to the subject, formulas may be worked out for some. However, as mining has learned to its cost, there is a reverse side to the picture. Many years ago hydraulic gold mining was stopped in central California because the discharge of tailings into the streams allegedly damaged lands, rivers, and harbors below the mines. Several hundred million dollars worth of gold was left locked in the unworked gravels. Had this gold been mined and put to work in industry, it would very possibly have made a contribution to national wealth that would have offset all the potential damage. In many places too smelters have been shut down, mines abandoned, and entire communities wiped out because of damage or alleged damage to plants and animals by smoke from the smelter stacks. Since action was taken against the smelters as 'nuisances', relative values did not enter into the matter. In other instances, smelting companies were able to buy out the 'smoke farmers' at less than the losses they would have incurred if the plants had been closed. These, and numerous stream-pollution cases, emphasize the values minerals have that may be called 'social' as distinct from 'profit' values. How should these be assessed?

It is extremely difficult to measure the value in the ground of the primary product, e.g., coal or iron ore, produced by captive mines belonging to integrated companies. Captive mines, apparently, will continue to be run as long as the parent industry needs their product to supply its manufacturing subsidiaries, whether or not they can show a profit. The overall cost of the final product sold outside the organization is the controlling factor, and products are passed on at cost from de-

partment to department or from subsidiary to subsidiary, so that finally the sales department alone shows a 'profit'. Unless a considerable outside market exists for the ore or intermediate product, there is no way to judge the fairness or unfairness of the price allowed at any given stage. For copper public quotations are usually for the finished product, the electrolytic or refined metal. Unless all the intermediate plant operations are considered merely facilities for production, how can anyone be sure of the worth of a ton of copper-bearing ore in the ground? As the petroleum industry has become more and more closely integrated, it has come *pari passu* to regard everything from oil well to filling station as a mere facility and not to expect a tangible profit from each step, such as a refinery or a pipe line. Pipe lines, it is true, occupy a rather special position, since their rates are in the province of the Interstate Commerce Commission and are largely influenced by the effect on actually, or potentially, competing railway rates.

For purposes of this paper we attempt to establish the value of the copper, gold, bituminous coal, petroleum, natural gas, and iron ore in the known reserves in the ground as of 1929, 1939, and 1946. Representative items, they include collectively the larger portion of the known subsoil mineral wealth of the country. But even they cannot be evaluated accurately. To cover the remaining minerals would require long and careful special studies, leading at best to approximations.

Published sources of many kinds have been consulted, and numerous discussions held with engineers within and outside the Department of the Interior. No figure given here is final or exact; all are first rough approximations and of possible use only in pointing the way to a more comprehensive and exact valuation if that is considered worth making. Two general conclusions stand out: The present value, in the ground, of the mineral resources of the United States is surprisingly small when the tonnages involved and the extent to which the minerals are essential to our national way of life and future security are considered. Mining as a whole, whatever may be true in specific instances, is not an especially profitable industry and

subsists on a very narrow margin of profit. It is more what is put into a mine in the way of work and thought than what is taken out that determines profit or loss.

Two important conclusions follow from the above: The margin of profit being small, the present value may easily be wiped out by unsound public policy, such as overtaxation or any other action that may increase cost or narrow the margin between it and price. Even delaying action may operate to decrease present values notably. Technology is supreme, and the reserve that will most largely influence our future security is less in the ground than in the brains of the men concerned with the industry.

A COPPER

Copper is the largest nonferrous metal mining industry; its production gave rise to more than half of the dollar value of metal production in 1929. As data on it have been widely circulated, it may well be taken as typical of the group. Estimates of reserves covering ore in the ground became generally available when the porphyry coppers were being developed. Until then, nonferrous mining had been a small unit industry, and capital for it had come largely from within the industry. Mass production required large amounts of capital, for which the industry had to go to the public; to interest the latter in such investments, it became necessary and customary to supply data of the type used by promoters—carefully made engineers' reports on the ore in the ground available for treatment. Publication of ore reserves became common, except by such companies as Anaconda, which depended on vein deposits of a type for which estimating far ahead of production is expensive and uncertain. To this day, Anaconda does not publish ore reserve figures for its Butte properties, though freely doing so for other properties it controls where other conditions prevail. Since 1910 in the industry as a whole, ore reserve figures have been generally published and widely discussed.

Two summaries of these ore reserve figures have recently

been published. One is a report on the Copper Industry by the Federal Trade Commission, of which a summary was published March 11, 1947. The other is a chapter by Ralph S. Cannon, Helena M. Meyer, and McHenry Mosier, in the *Mineral Position of the United States* (see note 3). In the first report the copper content of known ore reserves in the United States is estimated to be 29 million short tons. In the second, the recoverable copper under conditions and prices of 1944 was placed at 20 million tons. The second report states that in the 'thirties, estimates credited the reserves with a content of 25 million tons, but the decrease is not explained. On the face of it, this suggests a net rate of exhaustion of about one-third million tons per year. The Federal Trade Commission has not published its method, but the estimate is assumed to have been based mainly on a study of company reports and published engineer appraisals. The Interior Department experts state that to the 10 million tons of reserve reported by companies was added 5 million estimated to be recoverable from reserves that had been developed or indicated later by the same operators. A second 5 million tons was added for expected extensions of known ore bodies or mineralized areas of proved value. There was no allowance for future discoveries of ore in other areas or, apparently, for marginal ore that may be brought into production through technologic improvement or by any advancement in price not immediately absorbed by increases in costs of production or wages. All these factors may become important, and although the margin left for increased recovery through improvement of standard methods becomes progressively narrower with each step in accomplishment, there are distinct possibilities of a wholly new technology by virtue of which ore entirely outside the present field of possible production may and almost certainly will be mined whenever the need is keen enough. The effect of higher prices is less certain. The wartime plan of premium production brought out relatively little additional copper, but the recent increases in price to the public have brought a surprising amount of marginal

ore from small producers to the custom smelters. On the whole, of the two estimates one is perhaps high and the other possibly a bit overconservative. If, for purposes of this paper, the reserve is taken to be 20 million tons of copper in ores that can be produced at the present margin of profit, the estimate will be at least of the correct magnitude.

Determination of the margin of profit, traced back to the pound of copper in the ore in the ground, is not easy. Quotations for copper are based on the metal after it has been mined, smelted, transported, and refined, so that the published price covers many items besides the cost of the metal itself. Moreover, the situation is complicated by the fact that copper is mined in conjunction with accessory metals. Lead, zinc, gold, silver, molybdenum, and other metals all come from copper mines in large amounts. Barger and Schurr (p. 369) found that only 93 percent of the copper produced originated in 'copper' mines, the remainder being supplied by mines of other metals. Conversely, 2.4 percent of the gold, 2.7 percent of the silver, nearly 1 percent of the zinc, and .5 percent of the lead were obtained from treatment of 'copper ores', to say nothing of the much larger amounts of lead and zinc ores mined as such but produced by copper mining companies. For many years Butte was the leading source of silver; now the Utah Copper Company is second in molybdenum production only to the Climax Molybdenum Company of Colorado, the world's largest producer. The copper refineries yield also most of such nickel and cobalt as are produced in the United States as well as most tellurium, selenium, and various other rare metals. Determining the cost of copper is indeed a problem in mixed costs.

It is also a problem to allocate earnings to various branches of the industry, from mining the ore to selling the fabricated products; there is no sharply marked dividing line save between refinery and fabrication plant. In practice, copper mining is considered to embrace only operation of the mines and beneficiation of the ores up to shipment to the smelters, where

ownership often changes. The majority of the transfers are, however, intracompany affairs, and the terms rarely made public. Custom smelters generally pay New York quoted prices for 95 percent of the copper in the ore, minus certain service charges presumed to cover profit, costs, and losses in process. Charges are not uniform; and most of the ore treated, even in custom smelters, is company-owned or comes from subsidiary or affiliated companies, so that conclusions based on smelting rates would be inconclusive.

It is also impossible to get satisfactory figures on the basis of royalties as a measure of the land owners' value for ore in the ground, since nearly all copper mining companies own in fee the ground they work. Leasing in the copper and other non-ferrous mining industries is common enough but is on a small scale—the lease of a particular stope or part of a mine or vein or even at times an entire mine. Since the lessor provides many facilities, and often services, the rates paid are not a fair measure of the value of the unmined ore. Mines and deposits are, it is true, frequently valued for sale or for purposes of combination or taxation; in these, the expected yield of metal is valued at the expected price when sold, minus the cost of production and selling, and credited with the gross amount to be won from accessory metals. Such valuations are calculated on the theory that the purpose of operating a mine is to get copper, and that any returns from other metals are incidental, as they are usually minor, and should be credited to the cost of producing the copper; moreover, any plant or operation involved is merely a facility to the general end and is not entitled to a separate profit. Analysis of a large number of valuation reports indicated that, from an expected price of 14 cents a pound, there was a residual value for the copper in the ground of about 1 cent, or about 7 percent of the sales price. Many of the big mines now operated were opened or equipped between 1910 and 1920; during that period a common figure for the expected future price of copper was 15 cents a pound. The actual average price, based on New York quotations for 1910-39 was about

14 cents. The average for 1910-20, which covered the years of World War I, was 18.32 cents. For the next decade, covering the period from the close of the war to the depression, the average was 16.09 cents. For the next decade, covering the depression and recovery up to World War II, the average was 9.76 cents. The general average for the 30 years, 14 cents, may well be accepted for the next period as a basis for the margin of profit, whatever the actual sales price per pound. Under normal conditions 1 cent a pound is believed to yield a sufficient margin. Economic forces, or, if necessary, government interference, will probably hold prices down to that level. It has evidently been high enough to attract to the industry adequate capital for expansion as the needs of the country have grown. A review of the histories of the companies that supply more than 80 percent of the product shows a profitable record.

There have been many important changes in the copper industry during the last quarter century. Consumption has increased, both by reason of the rise in population and the per capita advance in consumption. New uses for the metal have been found and old uses expanded. Scrap metal has become increasingly important in relation to newly mined ore. Exports, long an important feature of our metal market, have virtually ceased, and such American copper as now goes outside the country is largely in manufactured form. Imports have begun and in war years were large, about equaling the quantity needed to meet distinctly war needs. Contrary to common belief, we do not seem to have impoverished our copper resources to win the war, for the quantity produced apparently did not exceed much, if at all, that which would have been mined to supply the market for the same number of good business years.

Before World War II production of new copper from domestic mines was running about 800,000 tons a year. The average for 1925-29 was 885,826 tons, according to the *Minerals Yearbook*. Much lower during the depression, it rose to over a million tons a year during the war. It is now about 850,000 tons

a year and, except for labor shortages, can be held at that figure without undue strain. The known and probable reserves in the ground can sustain an estimated future output of 900,000 tons for 20 years without any major reorganization of the industry, although several of the present big producers will have to curtail heavily or be eliminated in 10 to 15 years. If the past ratio of discovery to depletion holds, the net amount that will have to be taken from the present reserve will be only about one-third that estimated here, and the life of the mines will be lengthened correspondingly. Based on an annual output of 900,000 tons for the next 20 years and a profit, or return, for the value of the copper in the ground of 1 cent a pound, the present value of reserves may be estimated approximately as follows:

Nine hundred thousand tons a year at 1 cent a pound 'profit' is equivalent to an annuity of \$18 million a year, which, for a 20-year life, would have a present value, if discounted at 3, 3.5, and 4 percent, of \$26,800,000, \$25,600,000, and \$24,500,000. On these various assumptions therefore, the 1946 value of the copper in the ground was about \$25 million. Many factors can alter this estimate, though probably not greatly. The life of the deposits may and probably will be lengthened by discovery and, as already noted, by changes in technology. The rate at which they will be worked may be accelerated by unexpected demand or retarded by substitution, by easing the difficulties in importing metal, or by other economic or political changes. Finally, the present value will always be influenced to some degree by the earning power of money. This value may be used for 1929 and 1939 since data on which significant changes could be based are unavailable.

B GOLD RESERVES

Because of the unique position gold occupies in the monetary system—serving as both a basis of exchange and a measure of value—determining the present value of the gold reserves of

the United States is a somewhat different problem from valuing other metal and mineral resources. For gold no selling or marketing problem is involved; the United States Mint will buy, at a price fixed by law or by Executive Order, all the gold produced. In the long run, this has a stabilizing influence on the economy, but as far as the gold ore reserves are concerned, the effect on their foreseeable life is pronounced.

Unlike other mining operations, manufacturing, or agriculture, higher costs of operation in gold mining cannot be passed on to the consumer in the form of higher prices. Therefore, when costs are rising, the profit margin is narrowed appreciably, so that much of the rock in the ground that otherwise could be mined at a profit no longer has economic value; ore reserves are greatly reduced, and the life expectancy of those remaining becomes much less. On the other hand, when operating costs are decreasing, the spread between the fixed market price and charges for labor and materials becomes wider, and rock having a low gold content can be mined profitably; such gold reserves increase appreciably, and the life expectancy is greatly prolonged.

Because of these conditions, the gold mining industry runs counter to other industrial trends, tending to expand during depressions. It does not have the advantages or disadvantages of normal competition; its sole competitor is the general level of prices; this influence is reflected in its life expectancy and in drastic changes in the margin of profit.

The ultimate effect on gold output is not as drastic as on gold ore reserves, because a certain percentage of the gold mined (roughly 30 percent during the past 5 years) is obtained as a byproduct of copper, lead, and zinc mining. Thus, even when costs are extremely high—and even during World War II, when gold mining was actually prohibited by the War Production Board—a certain amount of gold is inevitably produced as a byproduct of the recovery of base metals.

The gold ore reserve figures used in this preliminary study came from two sources: the 15th International Geological

Congress publication on the gold resources of the world (1929), and the 1947 report on the Mineral Position of the United States by the Geological Survey and the Bureau of Mines.⁶

The figures on ore reserves, total gross value, rate of production, and estimated life are based on conditions known to exist in each year 1929, 1939, and 1947. For the purpose of determining present value, these seem to be the soundest assumptions that can be made, although, obviously, gold production will continue long after the period of 'estimated life' has expired.

The gold reserves of the United States for these years were evaluated from two points of view: that of the producer who operates solely for the profit that can be won from the exploitation of a gold-bearing ore deposit; that of the consumer or consuming public. The first, perhaps the only one of merit, is the usual approach to the valuation problem. The second, which may be termed the 'nationalistic' viewpoint, recognizes that mineral resources, including gold, have both a strategic and an economic value to the country as a whole that cannot readily be measured by the profit accruing to the producer in the course of the exploitation of a mineral deposit. The importance of mineral production to national defense, for example, cannot readily be expressed in dollars. Perhaps the only satisfactory way of determining present value from this point of view is to calculate the present value of the amount of 'new wealth' to be created by exploiting mineral resources. To measure 'new wealth created' is somewhat difficult, but, briefly stated, it may be considered to be the gross value of the mineral or metal produced after due allowance for the return to the operator of all capital and other invested wealth. The results are not altogether satisfactory for gold because of the peculiar nature of the industry. It is believed, however, that this method might be successfully applied to other metals and minerals.

⁶ G. F. Loughlin and H. G. Ferguson, 'The Gold Reserves of the United States', *The Gold Resources of the World* (XVth International Geological Congress, South Africa, 1929); F. M. Chace, McHenry Mosier, and C. E. Needham, 'Gold', *Mineral Position of the United States*.

The conclusions concerning the present value of gold reserves in 1929, 1939, and 1947, examined from both points of view, are given in the accompanying summary.

Present Value of Gold Reserves, Summary

	1929	1939	1947
Estimated reserves, recoverable gold (oz.)	26,760,000	38,161,000	25,000,000
Total gross value	\$553,129,200	\$1,335,600,000	\$875,000,000
An. rate of production (oz)	1,682,000	3,950,000	1,500,000
	or	or	or
	\$34,700,000	\$138,250,000	\$52,500,000
Estimated life (years)	16	10	16 5

VALUATION			
<i>Profit method</i>			
1) Present value of profit on basis of av. profit for entire industry	0	0	0
2) Present value of profit assuming that \$1 an oz. could be made	\$10,000,000 (4% + 12%)	\$21,500,000 (4% + 10%)	\$10,590,000 (3% + 8%)
<i>Nationalistic method</i>			
1) Assuming no cost, no profit, & discounting total gross value to present value	\$208,000,000	\$479,000,000	\$325,000,000
2) New wealth created, taking into consideration invested capital, costs, taxes, & profit	0	0	0

1 Profit Method

Inasmuch as the present value of an enterprise is the same as the present value of the profit it may be expected to yield during its lifetime, the present value of a natural resource may be expressed in terms of the present value of the profit that may be won from recovering and selling that resource. This principle may be applied, using the Hoskold formula, to various natural resources, such as coal, petroleum, and copper, when the average margin of profit is fairly well known or can be safely assumed. However, it cannot be applied successfully to the gold mining industry as a whole, although it can be applied to individual ore deposits and to individual mining companies, for the simple reason that a margin of profit cannot be assumed. In fact, probably more money is spent in the search for gold than is ever returned. It is difficult to substantiate this

statement by statistics or direct evidence, but it is a view based on experience and common among mining men.

This abnormal situation arises from the fascination gold mining has for certain individuals. In many instances, the lure of possibly enormous profits encourages a share buyer to venture his money in the search for and exploitation of gold mines in the hope they will yield dividends commensurate with the risk. This venturesome practice results in a steady supply of newly mined gold, which may bring profit to certain companies or individuals but is not enough to return the invested capital plus a profit to the industry as a whole.

In view of this condition, it is doubtful that the gold mining industry has any present value when examined from the profit point of view, even though several individual mines may reap enormous profits. Even if one were to assume that gold mines could make a profit of \$1 an ounce, the present value of the average annual production and of the known reserves is relatively small. For example, in 1947 it would be only \$11,000,000 (see Sec. F).

2 *Nationalistic Method*

The consumer or 'nationalistic' viewpoint assumes that, regardless of profit or cost to the producer, the mining and recovery of gold over a period of years create a certain amount of new wealth for the benefit of the public at large. This new wealth is in the form of wages to employees, profits to supply and machinery merchants, taxes to local, state, and federal governments, profits to producers, and so on. In addition to these public benefits, gold is made available to be used as the basis of the credit system, for international exchange, and for the arts and sciences. Obviously, however, any estimate of the true amount of new wealth created *must* consider the cost to the producer of creating this wealth. Otherwise, the process simply represents the transfer of wealth from one group to another—a case of 'robbing Peter to pay Paul'.

Because more capital is spent in the search for and exploitation of gold deposits than is recovered, it is likely that no new

wealth is created; its present value, therefore, is zero. This does not mean that the gold mining industry does not have considerable intangible value. It simply means that this value, from the nationalistic viewpoint, cannot be expressed in dollars.

If one entirely neglects the cost factor, the present value of the United States gold reserves can be determined by discounting the total gross value of these reserves to the present value, using as a discount rate the percentage depletion for each year of the reserve for its estimated life $\left(V_p = \frac{P}{(1+r)^n}\right)$. This, of course, is a fictitious figure which may be a measure of the magnitude of the turn-over of the industry rather than of the true value of the gold mined.

C COAL

Coal mining is our largest mining industry; and the known reserves, measured either in tons or in years of life at the present rate of consumption, occupy front rank. The occurrence of coal deposits is such that it is relatively easy to make fairly accurate estimates of the quantity in the ground because of the general persistence of beds. Disappointments have cropped up in the course of mining; but, in general, and far within the limits of accuracy demanded by this study, there are no grounds for large doubt concerning figures for estimated reserves. These are calculated by the Geological Survey and Bureau of Mines as sufficient to supply present demands for bituminous coal and lignite for considerably more than 1,000 years. The anthracite reserves are deemed adequate to last 187 years, but because of the special circumstances surrounding its production and consumption, this study will consider bituminous coal alone. Of this, the reserve is so large that no anxiety about supply is felt, except for certain kinds of coal in certain areas. There is of course a final limit, but it is far away; although coal is not as unlimited in quantity as the reserve supply of magnesium and salt, derived from both land mines and the sea, or nitrates,

derived from the atmosphere, for all practical purposes it may be regarded as unlimited. In coal mining, the coal itself has always been the cheapest material the miner handled, hence it has been especially difficult to reach any high degree of efficiency from a conservation standpoint. To say that more than half the coal is left in the ground is an understatement, and its very abundance has led to much economic waste through overexpansion of mining whenever a temporary market shortage has produced an apparent scarcity of supply. After 1921, according to Treasury data, and until 1940 the coal industry of the United States ran at a loss, such profits as were made by a few companies being more than offset by deficits of the many.⁷ Apparently it is only in war years, when the sudden increase in demand and the national shortage of labor and supplies temporarily prevent the opening and equipping of new mines, that coal mining yields a gain. A big war every generation or a big strike every year or so can hardly be considered nationally profitable even if one result does happen to be a temporary profit to our biggest mining industry. It is manifestly difficult to evaluate a business that for so much of the time operates at a loss, however necessary and beneficent it may be to the national economy and to defense.

The bituminous coal industry was equipped in 1946 to turn out 620 million net tons a year—far less than demand. Since 1915, however, there have been more years when the market called for less than 500 million tons than when it has called for more. At the depth of the depression demand totaled as little as 300 million tons. In the years since World War I coal has steadily lost markets to competing fuels and to hydro power; the higher price established during the recent war forced a greater efficiency in burning. With an overcapacity of 20-25 percent and widespread monetary losses from mining, the hope of profits and the desire of individual fuel-using industries for an assured supply induced a sufficient flow of capital into the industry to maintain production and provide for some expansion. Apparently the present expected rate of profit is

⁷ *Minerals Yearbook, 1943*, p. 838.

sufficient to keep the industry functioning. Both costs of production and prices at the mine have risen, but the margin has been substantially the same for the last 40 years. It is this margin—the measure of the value of coal in the ground—that is crucial. The operator is little benefited by a higher sale price if his costs and taxes rise in the same ratio. Moreover, he cannot afford to pay more for additional tonnage in the ground, either in the form of royalty or by purchase in fee; these costs have apparently kept pace with increases in price and seem likely to continue to do so.

Of several reasons for the slim prospect of higher profits from coal mining, three are outstanding. First, since wages are still the largest element in production cost, higher rates of pay eat up the economies in other elements. Increased mechanization is transferring part of this cost from labor to capital, but the charge for the latter, despite falling interest rates, does not seem to decrease as rapidly as labor cost rises. The miners have succeeded in absorbing most of the profit from mechanization and may well press for more. Their standard of living has risen with their wages; though socially, and probably economically, a good thing, this is not conducive to lessening demand for higher pay. As opportunities have opened and wages have risen in other industries, fewer boys in miners' families have followed their fathers' trade—mining is not unique in this respect.

Second, the likelihood of higher taxes in the future, though less certain, is ominous. The progressive demands on government put cumulative pressure on legislative bodies and tax authorities to pounce on any possible source of revenue. The power to tax has been well said to be the power to destroy; but as long as an industry continues either to breed capital within or attract it from without, fear of killing the proverbial goose that lays the golden egg is unlikely to prevent tax authorities from making heavier assessments or raising rates.

The third factor is competition, not only with alternative sources of energy but within the industry itself. So much good coal land is available for development that competition is keen within the industry, nearly everywhere and always. Sellers'

markets are rare in the coal industry, and selling agents and staffs are prone to cut prices to the limit. Even a small portion of the coal sold at too low a price may ruin the market for a large part of the output, and once reduced, prices are hard to restore.

For these and other less important reasons, the margin of profit, and hence the value of coal in the ground, is not likely to rise as long as an adequate tonnage comes to the market on the present basis. If profits become larger, it is more than probable that labor will demand a bigger share, that the taxing authorities will grab them, or that competing sales forces will dissipate them by cutting prices to get tonnage from competitors. Therefore it seems safe to predicate future earnings on the current margin of profit; in the absence of an elaborate study and many more data than are now available, this marginal profit per ton is the readiest measure of the value of the coal in the ground. It is the expectation of realizing such profit that induces coal production.

Unfortunately, no estimated figure for expected profit per ton can be accepted with full confidence. Some data may be obtained from examination of royalties, some from actual profits revealed or predicated in case of purchases of land or consolidation of companies, and some from studies of operations of particular companies, but the exact figure must be largely a matter of opinion. As such, rather than as an ascertained fact, it is believed that the amount left over after more immediate bills have been met and therefore available—or expected to be available—to pay for the coal itself, is of the order of 10 cents a ton. It is believed that, over a term of years and on the average for the whole industry, not more than this amount has been realized from mining itself, and that, on the expectation of such profit, adequate capital to maintain the industry at the present status is likely to continue to be forthcoming. This price would correspond to about \$500 an acre for coal rights in undeveloped land containing a 5 foot bed of coal of good grade and fairly accessible. Government leases of coal land in the West generally call for 5 cents a ton; however,

large mines have been opened and operated at twice this rate, although the coal, while thick, was lignitic rather than bituminous but so situated as to permit open-pit mining. Near centers of consumption, or with coal of superior grade, a higher price would be paid; however, as a general average, the figure is believed to be near enough the truth to serve.

The present value of the coal reserve depends on the number of tons that will be mined and the rate at which it will be brought to market as well as on the unit value. In view of the virtually unlimited amount available, the tonnage mined will depend upon market conditions, and the term of years through which production can be figured will be restricted only by the decreasing present value of the returns. Except for temporary heavier demand in war years and smaller demand in deep depression, output has been fairly stable since 1915—between 500 and 600 million tons a year. The long steady rise in demand from the beginning of the century was checked by the initial effects of World War I. Since then the trend has been generally about level, year after year, and 500 million would be approximately correct as the normal output. Assuming, as seems probable, that industrial growth will offset the effects of competition of other sources of energy plus any additional loss of market due to greater efficiency in the use of coal, only some extraordinary change could be expected to upset this assumption of future market.

Another war would do so. Failure of the supply of petroleum or natural gas would do so, at least temporarily. A shift in international demand might do so permanently, as it is now doing temporarily. Application of atomic energy to industry might in time ruin the coal industry, but it is hardly likely to do this within any short period. These various possibilities cannot be balanced with certainty, and we can only assume a future production rate of 500 million tons a year as a conservative estimate of average demand. Coal will be produced at present values for 40 or 50 years. Although coal to be produced in the years beyond has some present value, it cannot be reduced to a dollars and cents figure with any degree of assurance. The

problem, then, becomes one of ascertaining the present value of the future output through 40 to 50 years of 500 million tons of coal at 10 cents expected profit a ton; in other words, the present value of an annuity of \$50 million for the periods stated and at assumed discount rates. For reasons already given, these are calculated at 3, 3.5, and 4 percent, determined by the assumed rate at which depletion reserves could have been set to work in 1946, 1939, and 1929. For convenience, the results were calculated for both 40 and 50 year periods. To the objec-

	<i>Discount, %</i>	<i>40 years, \$billions</i>	<i>50 years, \$billions</i>
<i>1929</i>	<i>4</i>	<i>0.990</i>	<i>1.074</i>
<i>1939</i>	<i>3.5</i>	<i>1.068</i>	<i>1.173</i>
<i>1946</i>	<i>3</i>	<i>1.156</i>	<i>1.286</i>

tion that a billion and a fraction dollars is a very small sum to assign as the present value of 20-25 billion tons of coal, it may be pointed out that although the coal may be sold for \$2 to \$2.50 per ton at the mine and bring in \$40-60 billion, these sums include not only what is paid for the coal but the cost of producing it, and the latter is by no means an asset to the land owner.

The instructive feature of these calculations is the small present cash value of an undeveloped resource, even though it is large in amount and essential to industry before it is put to work. The United States is rich not because of its natural resources but because of its people. With about 7 percent of the world's population, it produces half the world's goods because it puts its latent resources to work.

The foregoing value does not take into consideration the possible expansion of coal production if a synthetic liquid fuels industry is established in the United States. Such a development might well treble the demand for coal in two or three decades.

D PETROLEUM AND NATURAL GAS

Of the three years specified by the Conference on Research in Income and Wealth, the estimates of the current market value of the proved oil and gas reserves of the United States at the

close of 1929 and 1939 present the most difficulty. At the close of 1929 the development of the oil industry was about midway between the discovery of the Oklahoma City field and the huge East Texas field. The oil states generally had not yet adopted the policy of regulating oil and gas production, and the more modern accomplishments of petroleum engineering were first appearing. Current data on the proved oil and gas reserves were not accessible to the public and values were still affected by price changes due to surges of excess supply. More data are available on the proved reserves at the close of 1939, but prices then were lower than in the preceding 3 years, and gasoline prices at the refineries were moving down. Accordingly, it is more difficult to determine the value of the proved oil and gas reserves at the close of 1929 and 1939, and any such determination is subject to more widely divergent viewpoints than is determination of the value of such reserves as of the end of 1946.

Within the limitations of the data and recognizing that the request is for approximate estimates only, the following values, in billions as of December 31, are suggested for the proved oil and gas reserves of the United States, producible through existing wells by methods currently in use: 1929, \$6.5; 1939, \$9; 1946, \$15. These total values were obtained by multiplying the number of barrels or cubic feet of natural gas in the proved reserves by the value per barrel of oil or cubic foot of natural gas at which such oil or gas reserves were evaluated in the trades and transfers of oil and gas properties at the time. The calculation is based on average values and assumes that the values expressed in the transfer of individual properties are applicable to the entire reserves. The estimates are an expression of value that is not related to the corporate valuation of such assets or reflected generally in the purchase and sale of securities on the markets.

The 1946 figure was calculated by applying 50 cents a barrel to the approximately 24 billion barrels of crude oil and liquid hydrocarbons in the proved oil reserves and slightly less than 2 cents a thousand cubic feet to the 160 trillion cubic feet in the

proved gas reserves, giving \$12 billion for oil and \$3 billion for natural gas. Fifty cents a barrel is a minimum, as transactions at higher prices were being made at the close of 1946 and subsequently.

Opinions of individual buyers concerning the future supply and price trend of oil are not identical, nor are their needs equal; so these differences can be expected to influence the values placed upon such reserves by individual buyers.

The oil reserve data used for 1929 and 1939 were those compiled for crude oil by the Petroleum Administration for War, plus an estimated quantity for other liquid hydrocarbons, natural gasoline, and condensates. The reserve data for natural gas were the estimates customarily in use—about 45 trillion feet in 1929 and about 70 trillion in 1939. The proved oil reserves, as estimated by the Petroleum Administration for War at the close of 1939, are higher than the American Petroleum Institute estimates for the close of 1946, but the average posted crude oil price at the end of 1946 was substantially higher than in 1939.

Opinions will of course vary concerning the value of the 1929 and 1939 reserves, and the figures suggested here represent an intermediate viewpoint between higher or lower estimates. Less difference of opinion can be expected about the value of the 1946 reserves. Undeveloped and undiscovered petroleum resources of the United States are not included in the foregoing estimates. The estimates are based on proved reserves, which have been drilled and are in production status. The value added by the drilling and equipping of the wells obviously accounts for the major portion of the total estimated value.

For the purposes of this study an evaluation exclusive of values added by drilling and equipping wells is desired. Such an appraisal of oil and gas resources in the ground can be approximated from royalty payments to land owners stipulated in leases taken prior to drilling. As previously stated, 12.5 percent is well established as the land owners' share of petroleum. Royalty rates for natural gas and liquefied products derived

therefrom vary considerably, and are usually somewhat less than those for petroleum in recognition of the heavy capital investment required for liquefaction plants. It is assumed that they may average 10 percent. Applying these rates to the dollar value of oil and gas production in 1929, 1939, and 1946, and calculating the present worth of these annual royalty payments over the period indicated by known reserves and production rates in these three years, the value of oil and gas in the ground exclusive of value added by drilling and equipping wells is: 1929, \$1,674 million; 1939, \$1,971 million; 1946, \$3,336 million. The present worth computations assume an 8 percent return on invested capital with sinking fund rates at 4 percent in 1929, 3.5 percent in 1939, and 3 percent in 1946. Petroleum reserves were calculated as equal to 13 years of production in 1929, 19 years in 1939, and 14 years in 1946. Those of natural gas were equal to 23, 29, and 39 years in the same years.

E IRON ORE

A large amount of data is available on the reserves and value of iron ore, particularly in the Lake Superior region, which supplies 80 to 85 percent of the annual production. In Minnesota the tax authorities have collected and published the essential figures on reserves and value since 1914. In other states the federal and state geological surveys have made fairly satisfactory if less complete estimates. Burchard, Johnson, and Melcher, of the Geological Survey and the Bureau of Mines, have summarized the estimates and allow 3,726 million gross tons for the measured and indicated ore, 1,755 million for the inferred ore, and 62,915 million for the potential ore. Of these amounts, the first corresponds most closely to estimates of known reserves of ore in the ground, as that term is generally used. Of this total, 1,806 million tons are credited to the Lake Superior region, 1,561 to the southeastern United States, and 536 to the northeastern region, including New York, New Jersey, and Pennsylvania. The estimate for the southeastern

deposits is a little above other figures and for the northeastern a little below; but the ores of the southeast are perhaps most surely estimated in advance, and Burchard has long and intimate knowledge of them. The mode of occurrence of the ores in the northeastern region is such that it is much more difficult to make good estimates in advance of close drilling, which has been done in only a few districts. After many years during which the region had been only a minor producer, it has recently attracted renewed interest.

An excellent general summary of the whole iron ore problem has been made by C. M. White, President of the Republic Steel Corporation, which has carried on active exploration in the northeastern region as well as in other areas.⁸ White thinks each of the three regions now contains reserves of approximately a billion tons. There is no doubt that the total iron in the crust of the earth is virtually unlimited, and if in all districts the means can be found to process and work ores of the low grade mined in other producing districts, there is virtually no limit to the ore reserves. It is a problem in technology to convert rock into ore, and the critical point is the ratio between rate of discovery plus technologic development and that of depletion by use. White's figures on experience in the Lake Superior region permit some rather comforting inferences. The reserves for the entire region for 1939 are given as 1,380,900,000 tons, and for 1946, 1,144,129,000, a decrease of 236,811,000 tons. But in the 7 years shipments totaled 526,923,000 tons, a difference of 290,112,000 tons, which could have come only from additional discoveries. In other words, while the mines shipped 75 million tons a year, 41 million came from discoveries that otherwise would have been added to the reserve. This indicates a ratio of discovery to production of 55 percent for the principal iron ore region of the United States during years of unusually heavy shipments and of curtailed exploration due to wartime shortages of labor and supplies, to say nothing of the deterring effect on exploration of

⁸ 'Iron Ore and the Steel Industry', an address delivered before the American Institute of Mining and Metallurgical Engineers, March 1947.

the policy of taxing reserves in the ground for all the years after discovery and before production.

Recently concern has been voiced over the heavy draft on our iron ore reserves during the war; for example, by Hotchkiss in *Economic Geology*, May 1947. There can be little doubt that the big open pits in high grade ore on the Mesabi range, the shock absorbers for so many years, are rapidly nearing exhaustion. The Lake Superior iron ore reserves as a whole, however, are not being as seriously depleted as would appear at first glance. According to the present showing, a life of 27 years is indicated, even at wartime production rates and without further technologic developments that may reasonably be expected. About other ore producing regions less definite statements can be made. In the Northeast exploration is much less complete, and much heavier demands on it are to be expected to supply ore to the Atlantic coast steel plants reasonably certain to be built. In the Southeast, although there is no difficulty about total reserves, there is doubt about the continued availability of grades originally used to supply southern furnaces. The rich brown ores have been heavily drawn on, and the hard red hematite ore of the Birmingham district now being mined does not, on the average, contain as much iron as that mined in earlier years. In very general terms and for the country as a whole, it may be stated that whereas formerly 2 tons of iron ore yielded 1 ton of pig iron, now 2.5 tons are required. The southern companies are already hunting for richer ores that may be imported to improve the furnace charges. The conditions that once made the Birmingham district the cheapest large producer of pig iron have changed; in time, this will certainly be reflected in the value of ore in the ground, so that conservative figures must be taken in valuing the country's reserves. An independent appraisal on the basis of present royalties would probably put the value at 15 cents, or even more, per ton in the ground, but it seems wiser to use the 12.5 cents assessed by the Minnesota Tax Commission for the 1,034,300,000 known Minnesota reserve tonnage as of May 1, 1945.

This places, as of May 1945, a value of \$129 million on the Minnesota reserves. State agencies estimated total reserves for the Lake Superior district to be 1,381 million tons in 1939 and 1,144 million in 1946. Applying the Minnesota assessment rate to the region as a whole, the total value of the Lake Superior ores in the ground may have been \$173 million in 1939 and \$143 million in 1946. All these figures are low, since the old range ore found in other parts of the Lake Superior district is of higher grade than the Mesabi, which dominates the Minnesota figures. Old range ore is also more expensive to produce, so that a more exact statement cannot be made with the data at hand. On the basis of the Department of the Interior estimates, the Lake Superior ore reserves may be considered to have a present value in the ground of about \$163 million. If it is considered that the ore reserves of the entire country have a similar value per ton, the total would now be approximately \$466 million. Although no attempt has been made to work out exact figures for 1929 and 1939, such data as are available seem to indicate that they would not differ from those for 1946 to any large degree.

One factor that may materially influence realization of this sum is change in practice. It is not iron or even iron ore consumption that fixes demand and prices, but steel consumption; the quantity (in tons) of iron ore used to produce 1 ton of steel fell from 1.47 in 1912 to 1.10 in 1937, rose to 1.45 in 1942 but fell to 1.13 in 1943.

Before World War I the ratio of iron to scrap in a steel furnace was of the order of 1.1. At the moment, owing to a shortage of scrap and an exceptional demand for steel, the blast furnaces are being called upon to furnish unusual amounts of iron; but this does not seem likely to continue, and the trend of more steel from less iron ore will probably be resumed, since the stock of steel in use and hence the amount potentially available as scrap is increasing. This may, in time, seriously affect the demand for iron ore and compensate, to a degree not easy to evaluate, for any scarcity that would otherwise develop from the exhaustion of ore reserves.

F CONCLUSIONS

On the basis of the five minerals studied, we may estimate the value of all subsoil mineral resources. In 1929 these commodi-

<i>Reserves</i>	<i>1929</i>	<i>1939</i>	<i>1946</i>
	MILLIONS OF DOLLARS		
Copper	25	25	25
Gold	10	22	11
Coal	1,074	1,173	1,286
Oil and gas	1,674	1,971	3,336
Iron ore	466	466	466
Total	3,249	3,657	5,124

ties contributed 67 percent of the value of all minerals produced in the United States as reported by the Bureau of Mines; in 1939, 74 percent, and in 1946, 75 percent. No attempt has been made to determine the values of the other resources that contribute the remaining 25-31 percent. Among these are anthracite and the nonmetallic minerals such as stone, sand, gravel, cement, and lime which are mined under conditions of royalty payments and unit-profit margins not greatly unlike those for coal and iron ore. Nonferrous metals other than copper and coal also contribute significantly to the nation's annual output and these are produced under conditions similar to those prevailing in copper and gold mining. Consequently, for the purposes of this study and in the absence of more specific data we may apply to all minerals the average ratio of resource value to the value of annual production as determined by our sample of five minerals. The order of magnitude is: 1929 and 1939, \$5 billion; 1946, \$9 billion.

In appraising the significance of these figures it should be clearly understood that the present value of the subsoil resources of the United States cannot be estimated precisely. Such tests as have been made in the course of this study have led to figures much smaller than those commonly published. The discrepancy is probably due to confusion between the sale price at the mine and the value in the ground. As already pointed out, the former includes the cost of production as well as the value in the ground. Oil and gas are an interesting illus-

tration. Swanson's estimates give a present value to the reserves of these materials much higher than their value to fee owners, larger than any other reserve studied here, and even larger than the total for all resources as computed above. To be sure, petroleum ranks first in gross sales (\$2,093 million in 1945), and natural gas (\$821 million in 1945) is well up toward the top. These are intrinsically high value materials and cost of discovery is one of the chief elements in production costs. Furthermore, the normally short interval between discovery and production has made the petroleum and gas industries unusually profitable. Nonetheless, it does not seem probable that the 15 years of known petroleum supply is worth 12 times as much as the 3,000 year supply of bituminous coal. Here in particular there should be some way of bridging the gap between the present value of the coal reserve as a source of profit and its value to the nation. The marked difference doubtless arises from the fact that petroleum companies refine and market petroleum products as well as produce crude petroleum, thereby retaining their hold on the major share of the profits of the industry, while the major profits of coal mining go to the railways, steel companies, or the marketing agencies. The major users of coal supply funds to keep coal mining active without too much regard to whether the mining operators make money or not as long as coal is shipped over the railways or supplies the coke ovens. In part, the same problem appears in the case of iron, where the larger mining operations are conducted by subsidiaries of steel companies. Just what would be the effect of a nicer adjustment of profits between parent and subsidiary companies or between department and department cannot be foretold with certainty; but, in justice to mining, it should be recognized that all too often mines are run at a loss in order that another industry may pay a 6 percent or larger dividend.

It should be remembered that the estimated values presented here are based upon quantities of known mineral in the ground or mineral believed, with good reason, to be there. Beyond this there are, in most categories, quantities of potential ore that can fairly be considered enormous and, in many

instances, the technology necessary for bringing these 'potential' ores into the probable or even actual reserves has already been worked out or is not far from perfected. For various reasons, there is no economic incentive to apply these methods now, and usually it would be inadvisable to do so. The value of these resources to the national economy and security is of course very much greater but cannot be measured.

For reasons given above, the valuations made here concern the mineral in the ground, not at the mine shaft, and all are present values. It is as if an inventory were taken of the stock on the shelves of a store to fix a price for the sale of the business. Common experience has shown that such a sale yields a smaller sum than would be realized if the same goods were sold in the natural course of continuing trade. The larger value would be more satisfactory, but at present there is no accepted unit of measurement.

Another matter that should not be forgotten is this: The value of mineral resources is determined quite as often by market conditions as by quantities of ore in reserve. Were markets adequate, the present annual coal output of the United States could be multiplied many times, with profit to the national economy and without danger to our future safety. The difference between present and future values of a dollar to be received is so great that the time of production rather than the quantity in reserve determines the present value of many minerals.

Counting eggs before they are hatched is admittedly ill advised, but the fact that chickens are not yet born does not imply that our grandchildren will not have eggs for breakfast. It does, however, point to sound reasons for keeping our chickens well fed and healthy; and, if we are to enjoy continuing prosperity in the mineral industries, it is as essential to avoid public measures, such as taxation of developed reserves, that will retard growth as to stimulate technologic improvement in discovery and beneficiation. The vast quantities of basic metals in the ground have little or no value until dug out and put to

work. From time to time it may be necessary to shift from the production of one mineral to that of another as scarcity approaches and substitution becomes advisable. Minerals are wasting assets, but mining need not be a diminishing industry. For all resources, the ratio of discovery to depletion is crucial.

Compiled Balance Sheet
of
Manufacturing Enterprises

Martin R. Gainsbrugh
and
Lucie Krassa

National Industrial Conference Board

THE ESTIMATES COVER ALL ACTIVE CORPORATE and noncorporate enterprises engaged in manufacturing industries as defined in the Standard Industrial Classification. This classification was adopted by the Bureau of Internal Revenue and of the Census in 1938 for *Statistics of Income* and the *Census of Manufactures*,¹ the two main sources used in this paper. However, as the industrial classification in *Statistics of Income* is based on the predominant business of the corporations filing income tax returns, the 'manufacturing' group does not contain corporations engaged solely in manufacturing, owing to the diversified industrial activities of many corporations.² Inactive corporations, i.e., those that did not report income or balance sheet data to the Bureau of Internal Revenue, are not covered. Establishments that were idle throughout the year or that manufactured products valued at less than \$5,000 (the latter are negligible) are not included in the *Census of Manufactures*.³

Statistics of Income embraces the forty-eight states, the District of Columbia, Alaska, and Hawaii. We deducted assets owned by manufacturing enterprises in Alaska and Hawaii so that our estimates cover only the continental United States. As the data include the American assets of resident foreign corporations, i.e., foreign corporations engaged in trade or

¹ Data for 1929 were adjusted accordingly. No changes in industrial classification affecting the 'manufacturing' group as a whole were made between 1938 and 1944.

² The industrial classification in *Statistics of Income* for 1929 and 1944 is based upon the predominant business of groups of corporations filing a single consolidated return.

³ In the earlier quinquennial censuses, establishments with products valued at \$500 or more were included. The difference in coverage, in terms of value of product, was 0.3 percent in 1921 (*Census of Manufactures, 1939*, I, pp. 1-2). In 1929 and 1939 the importance of establishments with products valued at less than \$5,000 was presumably even smaller. Establishments with products valued at \$5,000-20,000 produced only 1.1 percent of the total annual product in 1929 and 0.9 percent in 1937 (Solomon Fabricant, *Output of Manufacturing Industries, 1899-1937*; NBER, 1940; p. 329).

The definition of 'establishment' was modified in 1937. Prior to that year one return was usually counted as representing one establishment, although it might cover two or more plants operated under the same management. In 1939 the number of establishments represented by a return depended upon the number of plants covered by it.

business or having an office or place of business in the United States, domestic manufacturing assets cannot be strictly segregated on the basis of the residence of their owners or of the location of physical assets.

The estimates must be used with caution for the following reasons: Data in *Statistics of Income* for 1929 and 1944 were adjusted to represent a situation as if the privilege of filing consolidated returns had not existed in 1929 and 1944 (see App. C). Hence the estimates for 1929 and 1944 are only approximately correct. In comparing data for 1929, 1939, 1944, and 1946, it must be kept in mind that mergers of parent companies and their subsidiaries and mergers generally during this period cannot be accurately evaluated.

Because Census data for years later than 1939 are lacking, estimates for the noncorporate sector in 1944 are highly tentative. All estimates of inventories for 1946 are also highly tentative since the basic statistical material is not yet available.

The corrections for changes in the price level between 1929 and 1939, 1939 and 1944, and 1939 and 1946 are extremely rough, reflecting trends rather than absolute levels.

A CHANGES IN THE PRICE LEVEL AND THE MEANING OF BOOK VALUES

Comparisons of balance sheet data for different years cannot be meaningful—especially in periods of rapid and substantial price changes—unless amounts in current dollars are reduced to an approximately uniform price level. This task is highly complicated for several reasons:

- 1) Changes in prices are not isolated phenomena. Influencing the development of prices while being influenced by it, the production and supply of goods change, as well as the character of the demand. This is particularly true for the transition from a peace to a war economy, and vice versa.⁴ In the whole-

⁴ For a discussion of these and related problems see Carl Shoup, *Principles of National Income Analysis* (Houghton Mifflin, 1947), pp. 216-21, and the literature cited there. See also Simon Kuznets, *National Product, War and Prewar*

sale price index of the Bureau of Labor Statistics, the price for each commodity is usually weighted by a factor representing the average quantity of the commodity marketed in 1929-31. In addition, for some goods no price quotations were available during the war, and new goods were added during the period examined.

2) Price indexes are inadequate also as a measure of actual prices paid. The wholesale price indexes of the Bureau of Labor Statistics are usually based on prices for certain standard grades of articles; hence they do not provide complete coverage.

3) The date of the price index to be applied is uncertain, as some balance sheets are not drawn as of December 31. A considerable number of fiscal year companies reported in 1929 as well as in 1939 and 1944. Their importance cannot be evaluated for the manufacturing group. For all industry groups, the income tax paid by fiscal year companies amounted to about 17 percent of the income tax paid by all corporations in 1939, for example. In our estimates the December index was usually taken.

4) Balance sheet figures are not stated in current prices, but are rather the result of special handling of book values in accordance with established accounting practice. The following groups of balance sheet items may be distinguished:

a) Cash and deposits in banks, receivables, investments in government obligations, notes and accounts payable, and other debt, as entered in the books, may be considered to fluctuate in value with the purchasing power of the currency. The wholesale price index of the Bureau of Labor Statistics for all commodities (December) was applied to transform these balance sheet items into units of constant purchasing power.⁵ Three and a half billion dollars in cash and bank deposits of manufacturers at the end of 1929 could buy fewer goods than at the end of 1939. The use of the wholesale price index is

(NBER, *Occasional Paper 17*, 1944), pp. 6 ff., and *National Income: a Summary of Findings* (NBER, 1946), pp. 128-34.

⁵ The index was 93.3 in December 1929, 79.2 in December 1939, 104.7 in December 1944, and 140.9 in December 1946. 'Other assets' were deflated similarly.

justified for cash and bank deposits as far as they serve to buy new stocks of goods or capital assets.⁶ The movement of the Conference Board wholesale price index for ten industrial raw materials (1929, 1939, and 1946) is similar to that of the BLS wholesale price index for all commodities. The index of industrial building construction cost (Aberthaw) diverges considerably from the wholesale price index for all commodities in 1939, but shows a similar relationship between 1929 and 1946.

To the extent that cash is used for paying wages, an index showing 'unit labor cost'—the ratio between output per man hour and gross hourly earnings—might be more appropriate. Discrepancies that may have existed between the wholesale price index and such a unit labor cost index during the period examined were not taken into account.

Obviously, whenever cash or government securities are held through a period of high prices until the turn of the tide, they rise in value. Such assets, therefore, have a larger value as bad weather reserves than would be gathered from the deflated figures. Notes and accounts payable in the amount of \$10 billion could be more easily paid at the end of 1929 because prices paid to manufacturers were higher than in 1939. As regards long term debt, the argument might be advanced that the purchasing power of a currency when the debt is due determines the true value of the amount owed. However, to the degree that the long term debt is of a marketable character, a point may be made for applying the price index prevailing at the time the balance sheet is drawn up.

b) Book values for inventories, capital assets, and investments other than in government obligations do not fluctuate with the purchasing power of the dollar.⁷

i) Inventories are entered according to various methods: at cost or market, whichever is lower (probably the most extensively used method); at cost; at market after deducting a dis-

⁶ It is likewise justified to the extent to which current assets represent depreciation reserves.

⁷ See Copeland and Martin, 'The Correction of Wealth and Income Estimates for Price Changes', *Studies in Income and Wealth*, Vol. Two, pp. 88 ff.

count. 'At cost' may mean different things depending upon whether the last-in, first-out method (allowed for tax purposes generally since 1939)⁸ or another method is used.⁹ 'At cost' is ambiguous also in that it depends upon the interval goods are held in stock, the interval between ordering and receiving them, and similar factors. 'At market' may mean current replacement cost or sales price.¹⁰

In our estimates amounts for inventories in current dollars were adjusted in accordance with the price index implied in the inventory valuation adjustments by the Department of Commerce for inventories held by manufacturing firms.¹¹ This index was 128.0 in 1929, 100 in 1939, 121.0 in 1944, and 140.1 in 1946.

ii) Tangible capital assets except land (plant, machinery, and equipment) are entered at cost in tax reports. Deductions are made for depreciation, or a depreciation reserve is set up. Usually amounts entered for depreciation do not necessarily indicate the change in the intrinsic values of the assets. Thus, book values of capital assets, net, show the amount of capital invested in fixed assets and not recaptured by depreciation allowances, as permitted by the Bureau of Internal Revenue. The meaning of the book value of capital assets depends upon various factors:

Method of depreciation. Depreciation is usually on a straight line basis.¹²

Rate of depreciation, computed in a 'liberal' or conservative way (compare differences in the rates of depreciation in the

⁸ Revenue Act of 1939. According to the Revenue Act of 1938, the LIFO method was allowed for tax purposes to tanners and to producers and processors of non-ferrous metals.

⁹ Internal Revenue Code, Sec. 22 (d), and Regulation III, Sec. 29.22 (d), provide for the elective use of "any . . . proper method which in the opinion of the Commissioner clearly reflects income," provided it is applied consistently.

¹⁰ See Simon Kuznets, *Commodity Flow and Capital Formation* (NBER, 1938), I, 405 ff; J. C. Bonbright, *Valuation of Property* (McGraw-Hill, 1937) II, 1014; C. F. Schlatter, *Cost Accounting* (Wiley, 1947), pp. 80-1, 232, 618 ff.

¹¹ *Survey of Current Business*, July 1947, Supplement, p. 45, Table 33.

¹² See Solomon Fabricant, *Capital Consumption and Adjustment* (NBER, 1938), pp. 66-7, Table 13.

1931 report of the Bureau of Internal Revenue and Bulletin F of 1942).

Volume of maintenance.

Differences between original and reproduction cost.

Retirement curves involved.¹³

The stage of the various property groups. Have annual retirements and renewals reached an even level, equal to the annual depreciation reserve credit, so that the situation can be considered stable? ¹⁴

Importance of extraordinary obsolescence, which rises in periods of rapid technological changes.

Writedowns.¹⁵

This brief summary of the factors that determine book values of capital assets makes it appear doubtful whether book values are suitable as a measure of the adequacy of our manufacturing plant or of its reproduction cost. Economists, in measuring capital assets, have often relied solely on book values.¹⁶ Contrariwise, management in many cases has deemed such data insufficient. In the last few years, particularly, the practice seems to have spread among industrial concerns having large investments in fixed assets to keep property records which, among other things, show reproduction cost as well as original cost and accrued depreciation. Many concerns make periodic appraisals of property (say, every five years) and adjust

¹³ See Robley Winfrey and E. B. Kurtz, 'Life Characteristics of Physical Property', *Iowa Engineering Experiment Station Bulletin 103* (1931); Robley Winfrey, 'Statistical Analyses of Industrial Property Retirements', *ibid.*, 125 (1935); Robley Winfrey, 'Depreciation of Group Properties', *ibid.*, 155 (1942).

¹⁴ *Ibid.*

¹⁵ Such writeups or writedowns are generally not recognized by the Bureau of Internal Revenue, it is true. In certain cases, however, the basis of depreciable property may be lowered. In the case of bankruptcy, for example, the basis of depreciable property may be lowered to the fair market value as of the date of entry of the order confirming the plan or arrangement; Public, No 699, July 1, 1940 (retroactive to June 22, 1939). Similarly, the basis of depreciable property may be lowered in certain corporate liquidations; Internal Revenue Code, Section 113 (a) (7) and (18).

¹⁶ E.g., Slichter for determining the adequacy of capital assets at various points in the past seventeen years.

them annually to determine values for fire insurance coverage.¹⁷ Similarly, some manufacturers have applied a dual system of depreciation rates, especially since 1936. Some firms even maintain three sets of books: one for cost purposes, one for tax purposes, and one for appraisal purposes.¹⁸

In view of these complex problems, it is doubtful whether compiled book values of tangible capital assets as based on *Statistics of Income* can ever be satisfactorily deflated for changes in the price level. Moreover, "capital assets are rarely replaced in kind. Indeed by and large, they are replaced because different and better assets are available."¹⁹ This reduces the validity of a capital equipment index. As a matter of fact, the Department of Commerce has refrained from publishing a capital equipment index for 1943-47.²⁰ Accordingly, the Department, the Federal Reserve Board, and the SEC give estimates of plant and equipment expenditures for the war and postwar years in current dollars only.²¹

Fabricant's method of constructing an index of prices underlying depreciation charges and an index of prices underlying book values of capital assets cannot satisfactorily be applied to the years following 1939 because of the lack of Census data.²² In this paper an attempt was made to supplement the data on

¹⁷ C. V. Armstrong undertook a study in 1939 with the aim of showing that "it is economically feasible for an enterprise having widespread physical property to establish and maintain property records" (*Industrial Property Records for Accounting and Valuation Uses*, *Iowa Engineering Experiment Station Bulletin* 160, 1944, p. 6).

¹⁸ H. G. Avery, *Accounting for Depreciable Fixed Assets* (Columbia University Press, 1940), p. 106.

¹⁹ George Terborgh, NICB, *Studies in Business Policy*, 27 (1948), p. 5.

²⁰ The latest figure given by Henry Shavell, 'Price Deflators for Consumer Commodities and Capital Equipment, 1929-42', *Survey of Current Business*, May 1943, pp. 13-21, is for 1942; the latest figure given by Kuznets (*National Product since 1869*; NBER, 1946; p. 36) is for 1943. Construction estimates were made also in 1939 prices (Bureau of Foreign and Domestic Commerce, *Construction and Construction Materials, Industry Report*, Statistical Supplement, May 1947, pp. 25 ff).

²¹ See, for example, M. L. Merriam, 'Current and Prospective Plant and Equipment Expenditures', *Survey of Current Business*, April 1948, p. 12.

²² *Capital Consumption and Adjustment*, Ch. 10.

book values of capital assets with some measures of physical capacity.²³

iii) Land, like reproducible tangible assets, is entered at cost. But the original capital outlay is usually not written off until the property is sold or otherwise disposed of.²⁴ During the war, even land (purchased for the purpose of emergency facilities necessary for national defense) could be amortized.

iv) Intangibles are likewise booked at cost. Many firms have written this item off after 1929.²⁵

v) Investments, other than government obligations. Long term securities are originally booked at cost and not subsequently altered when market values change. Short term issues are usually valued at the lower of cost or market.²⁶ Thus long term investments made in years of low prices (in the 1930's, for example) appear in balance sheets for 1944, for example, at cost.²⁷

In this paper the following compromise was made. Like the other adjustments for changes in the price level, its aim is merely to present approximately comparable figures for the

²³ To get consistent estimates in 1939 dollars in Table 1, the book values for capital assets at the end of 1929 were deflated 3 percent in accordance with Shavell's wholesale price index for capital equipment (average of yearly indexes for 1939 and 1940 on the average of 1929 and 1930 as a base). Book values for 1944 and 1946 were not deflated except for the net additions to capital assets (expenditures on plant and equipment minus depreciation) in 1940-44 and 1940-46.

²⁴ Bonbright, op. cit., p. 904.

²⁵ A sample study of the balance sheets of 346 industrial corporations published in *Moody's Manual of Investments, Industrial Securities* showed that the book value of intangibles decreased 52.5 percent and the number of firms recording intangibles at cost decreased 27 percent between 1929 and 1939 (H. G. Avery, 'Accounting for Intangible Assets', *Accounting Review*, 1942, Vol. 17, pp. 354-63). See also W. A. Paton's statement: "In the case of goodwill and allied intangibles . . . it has long been common practice to write off the total cost as soon as this could be done without impairing the showings of income too seriously, without regard to the actual status of the assets" ('Accounting Procedures and Private Enterprise', *Journal of Accountancy*, April 1948, p. 282).

²⁶ Bonbright, op. cit., pp. 949-50.

²⁷ Securities that give a dominant control are sometimes valued at cost plus or minus changes in their share of the surplus of the company that has issued them (Bonbright, op. cit., p. 950). But this does not seem to have been done to an appreciable extent in the 1940's.

various years, not to get accurate estimates. The item or entry 'investment' in 1929 was deflated by the wholesale price index for all commodities. Book values of investments for 1944 were not deflated, except for the increase between 1939 and 1944. Book values of investments, as well as deflated amounts, were assumed to be the same in 1946 as in 1944.

c) Net worth is here treated as a residual. Amounts for net worth in current dollars were not deflated independently; rather net worth in 1939 dollars was automatically determined as a residual.

Similarly, total assets after adjustment for changes in the price level are the sum of the various assets adjusted as described above.

Wages and salaries were adjusted for changes in the purchasing power of the dollar on the basis of the consumer price index (annual average) of the National Industrial Conference Board.²⁸

B SUMMARY OF FINDINGS

As shown in Table 1, total assets of American manufacturing enterprises amounted to \$72.5 billion at the end of 1929 (\$64 billion in 1939 prices), \$61.5 billion in 1939, \$102 billion in 1944 (\$87 billion in 1939 prices), and approximately \$100 billion in 1946 (\$76 billion in 1939 prices).

Net worth, in current dollars, followed the same trend. It dropped from \$53 billion at the end of 1929 to \$46 billion in 1939, and rose to almost \$67 billion in 1944, and further to about \$73 billion at the end of 1946.

In 1939 dollars net worth followed a somewhat different trend. It too was slightly lower in 1939 than in 1929. But while total assets increased nearly 41 percent from 1939 to 1944, net worth rose only 31 percent. Contrariwise, total assets decreased between 1944 and 1946, while net worth presumably went up from \$60 billion to nearly \$61 billion.

²⁸ The index (1923:100) was 100.1 for 1929, 84.5 for 1939, 104.6 for 1944, 113.2 for 1946.

Table 1
 Compiled Balance Sheet of Manufacturing Enterprises, Corporate
 and Noncorporate, End of Year, 1929, 1939, 1944, 1946
 (billions of dollars)

	Book Values				1939 Prices			
	1929	1939	1944	1946	1929	1939	1944	1946
1 Cash & bank deposits	3.6	5.0	12.5	11.7	3.0	5.0	9.5	5.6
2 Notes & acc. rec.	12.0	8.1	16.3	12.7	10.1	8.1	12.3	7.1
3 Inventories	13.2	11.8	19.3	22.9	10.3	11.8	16.0	16.3
4 Investments, govt. obligations	1.8	1.3	11.8	8.0	1.5	1.3	8.9	4.5
5 Other investments	7.0	9.1	11.1	11.1	5.9	9.1	10.6	10.6
6 Capital assets (less deprec.)	27.7	25.0	27.4	30.0	26.8	25.0	26.8	28.3
7 Misc. assets	7.2	1.3	3.6	3.6	6.0	1.3	2.7	2.7
8 Total assets	72.5	61.5	102.0	100.0	63.7	61.5	86.8	76.1
9 Accounts payable	10.0	5.2	10.6	9.0	8.4	5.2	8.0	5.1
10 Bonds, notes, mortgages pay.								
11 Less than 1 year	n.a.	2.4	3.4	10.2	n.a.	2.4	2.6	5.7
12 1 year or more	5.2	5.7	6.6		4.3	5.7	5.0	
13 Misc. liabilities	4.5	2.2	14.8	8.1	3.8	2.2	11.2	4.6
14 Net worth	52.8	45.9	66.6	72.7	47.2	45.9	60.0	60.7
15 Total liabilities & net worth	72.3	61.5	102.0	100.0	63.7	61.5	86.8	76.1
16 Reserves for bad debts	0.3	0.2	0.3	n.a.	0.2	0.2	0.3	n.a.
17 Tangible capital assets								
18 Gross	27.9	40.9	53.3	n.a.	...	...	...	...
19 Reserves	4.0	19.8	27.7	n.a.	...	...	...	...
20 Intangible assets								
21 Gross	n.a.	2.2	n.a.	n.a.	...	...	...	...
22 Reserves	n.a.	2	n.a.	n.a.	...	...	...	...
23 Land	3.7	2.1	1.9	n.a.	...	...	...	...
24 Wages & salaries	16.1	13.6	34.7	36.4	13.7	13.6	34.7	27.1

Because of rounding, components do not necessarily add up to total.

n.a.: not available.

LINE

- 2 Minus reserves for bad debts, see line 16.
- 3 Raw materials, work in process, finished goods, and supplies. Data for 1939, 1944, and 1946 were taken from Table 14 below.
- 4 Obligations of the United States, its possessions, or instrumentalities, and obligations of the states, territories, or political subdivisions thereof, or the District of Columbia.
- 5 Stocks, bonds of domestic and foreign corporations, mortgages, real estate, and all other investments or loans.
- 6 Tangible assets and land. Intangible assets are not included in 1929 but are in 1939, 1944, and 1946.
- 7 Sinking funds; other funds; deferred charges; organization expenses; suspense items; prepaid items (prepaid insurance, prepaid taxes, etc.); interest, discount coupons, and dividends receivable; guaranty deposits, and deposits on contracts, meters, and leaseholds. Including intangible assets for 1929.
- 9 Including notes payable with original maturity of less than one year for 1929.
- 13 Accrued expenses (interest, taxes, etc.); deferred and suspense items; funds held in trust, borrowed securities; discount and dividends payable; outstanding coupons and certificates; overdrafts; etc.
- 17 Buildings, fixed mechanical equipment, manufacturing facilities, transportation facilities, furniture, fixtures, and other depreciable assets, and natural resources.
- 18 Amount for 1929 was estimated by deducting, from the 1939 figure, expenditures on new plant and equipment in 1930-39, see Table 4.
- 19 Amount for 1929 was estimated by deducting from the 1939 figure \$16 billion for depreciation charges in 1930-39; see Lowell Chawner, 'Capital Expenditures for Manufacturing Plant and Equipment-1915 to 1940', *Survey of Current Business*, March 1941, p. 12, Figure 5.
- 20 Patents, franchises, formulas, copyrights, leaseholds, good will, trademarks, and other intangible assets. For 1929 data on intangible assets are included in 'Miscellaneous assets'. For 1944 intangible assets are included in lines 18 and 19 because separate data are not available.
- 23 Amount for 1929 computed as a residual from lines 6, 18, and 19.
- 24 *Survey of Current Business*, July 1947, Supplement, p. 27, Table 14.

1 *Balance Sheet Items, 1929 and 1939*

The summary is divided into two sections because 1939 is the last year of the peacetime economy and also the last year for which complete statistical data are available. Holdings of liquid assets, as a percentage of total assets, were about the same in 1939 as in 1929. Cash and bank deposits were larger, even absolutely, both when amounts in 1929 dollars are deflated for changes in the price level and when amounts in current dollars are compared (increase of 67 and 39 percent respectively). Receivables were considerably smaller, reflecting the smaller volume of business in 1939.²⁹ Corporations held slightly higher reserves for bad debts in 1929 than in 1939 (2.21 and 2.18 percent of the respective gross amounts in current dollars). Holdings of government obligations decreased 31 percent (in current dollars).

At the end of both 1929 and 1939 inventories were unusually high. In 1939 prices the increase was 15 percent. However, nearly 47 percent of the amount for 1939 represented stocks of goods held by war industries (Table 2).

Table 2
Manufacturers' Inventories, War and Nonwar Industries,
1939 and 1943
(millions of current dollars)

	WAR INDUSTRIES		NONWAR INDUSTRIES	
	Raw material & work in process	Finished goods	Raw material & work in process	Finished goods
Dec. 31, 1939	8,194	1,725	3,120	2,530
Sept. 30, 1943	8,130	1,887	5,180	2,522

Survey of Current Business, Jan. 1944, p. 9. Munitions output reached a peak in 1943.

'Other investments', comprising stocks, bonds of domestic and foreign corporations, mortgages, real estate, and other investments, increased considerably, about \$2 billion, between 1929 and 1939. A group of large manufacturing corporations (representing less than a third of all manufacturing corpora-

²⁹ Cf. data on corporate sales, *Survey of Current Business*, July 1947, Supplement, p. 41, Table 29, line 'Manufacturing'.

tions in terms of total assets) increased their investments in subsidiaries and affiliates \$1 billion (Table 3).

Table 3

Number of Mergers and Acquisitions in Manufacturing and Mining Compared with Increases in Investments in Subsidiaries and Affiliates of a Sample of Large Manufacturing Corporations, 1929-1939

	No of Mergers & Acquisitions	Increase in Investments (millions)
1929	1,245	\$586
1930	799	291
1931	464	183
1932	203	54
1933	120	98
1934	101	53
1935	130	39
1936	126	36
1937	124	47
1938	110	50
1939	87	95

A. R. Koch, *The Financing of Large Corporations, 1920-39* (NBER, 1943), p. 38, Table 6; W. L. Thorp, *The Structure of Industry* (TNEC Monograph 27, 1941), p. 233.

The \$9 billion for 'Other investments' in 1939 reflects the practice of accounting for such investments at cost, or at the lower of cost or market. Measured by the income derived from these investments their value was apparently higher. Corporations received nearly half a billion dollars in dividends alone, not counting interest payments (\$120 million from foreign corporations and \$367 million from domestic corporations).³⁰ *Statistics of Income for 1929* does not present data on dividends received from foreign corporations. But the amount received by corporations in dividends from domestic (1929 classification) corporations alone, \$584 million, indicates that the entries for 'Other investments' minimized their value even more than in 1939. The capitalized value of dividend payments from domestic corporations in 1929 has to be raised because income from consolidated subsidiaries did not appear as dividends on the books; on the other hand, dividends received by

³⁰ Interest received, other than on government obligations, amounted to \$104 million in 1939.

subsidiaries not engaged in manufacturing have to be deducted. The value of foreign investments at the end of 1939, of course, was affected by the war in Europe, which caused many companies to write off their European investments in part (e.g., Eastman Kodak).

The decrease in book values for capital assets (minus depreciation), about 16 percent (in current dollars),³¹ is due, at least partly, to the following factors:

1) The high book values for capital assets in 1929 were due to large additions at relatively high costs during the preceding years (see Table 4).

³¹ From the amount in Table 1, line 6, for 1939, Intangible assets, net (line 21 minus 22) must be deducted, as 1929 data on capital assets do not include intangibles. Note that the depreciation reserves (about \$20 billion at the end of 1939) were accumulated only in an accounting sense.

Table 4
Private Expenditures for New Manufacturing Plant and
Equipment, 1921-1946
(millions of dollars)

	Current prices	1939 prices
1921-24 (4-year total)	6,690	6,752
1925-28 (4-year-total)	8,733	8,698
1929	2,739	2,683
1930	1,908	2,028
1931-36 (6-year total)	5,997	6,887
1937	2,160	2,191
1938	1,393	1,405
1939	1,572	1,572
1940	2,580	n.a.
1941	3,400	n.a.
1942	2,760	n.a.
1943	2,250	n.a.
1944	2,390	n.a.
1945	3,210	n.a.
1946	5,910	n.a.

1921-39: Lowell Chawner, 'Capital Expenditures for Manufacturing Plant and Equipment—1915 to 1940', *Survey of Current Business*, March 1941, pp. 10, 11, Tables 1 and 3; 1940-46: SEC, Statistical Series, Plant and Equipment Expenditures of U.S. Business.

The data for the two periods are not strictly comparable in that service, maintenance, selling and other activities are not included in Chawner's series; for other differences, see G. B. Wimsatt, *Survey of Current Business*, Dec. 1946, p. 20.

n.a.: not available.

2) During the depression of the 1930's many enterprises wrote down their fixed-asset values to lower 'going-concern' values or to estimated replacement cost. Actual retirements seem to have been smaller than depreciation charges. When the value of capital equipment went up again at the end of the decade, book values of capital assets were not written up. Some studies have shown that during 1930-33 about 40 percent of the companies reporting wrote down their assets.³² Writeups or writedowns are generally not recognized by the Bureau of Internal Revenue, as pointed out above. However, exceptions to the general rule were apparently numerous enough in the 1930's to lower appreciably the compiled total for capital assets of manufacturing corporations as reported in *Statistics of Income for 1939*, the basis of our estimates for 1939.

3) In the early 1930's "deductions for depreciation claimed [and allowed] in income tax returns were in many instances excessive", according to the Commissioner of Internal Revenue.³³ This was possible under regulations of the Bureau of Internal Revenue which provided that "deductions will not be disallowed unless shown by clear and convincing evidence to be unreasonable".³⁴ Beginning with 1934 the burden of proof was put upon the taxpayer without any qualification.³⁵ This change was expected to reduce total annual depreciation charges by corporations about one-third.³⁶

³² For details, see Avery, *Accounting for Depreciable Fixed Assets*, p. 142. F. C. Dirks estimated, in 'Postwar Capital Formation and Its Financing in Manufacturing and Mining Industries' (Federal Reserve Board, *Postwar Economic Studies*, 5, Sept. 1946), p. 11, that "the gross value of plant facilities at the beginning of 1941 is probably 20 percent or more understated owing to various writedowns . . ."

³³ *Annual Report, Fiscal Year ended June 30, 1934*, pp. 9-10. This view has been disputed; see citations in L. H. Kimmel, *Depreciation Policy and Postwar Expansion* (Brookings Institution, 1946), p. 26.

³⁴ Regulations 74 and 77, Art. 205.

³⁵ Decision 4422, approved February 28, 1934.

³⁶ For comment on this change of policy see, for example, E. A. Saliers, *Depreciation Principles and Application* (Ronald Press, 3d ed., 1939), p. 201, and Fabricant, *Capital Consumption and Adjustment*, pp. 85-6. Avery, *Accounting for Depreciable Fixed Assets*, p. 14, pointed out that "comparatively little consideration was given to the proper accounting of fixed assets in the 1920's and early 1930's," i.e., before T.D. 4422.

4) The trend in the change of the ratio of expenditures for equipment to total new plant and equipment outlays continued in the 1930's (also in the 1940's). A constantly increasing percentage of total expenditures has been going into new equipment and a steadily decreasing percentage into new plant.³⁷ By this standard alone, total expenditures for plant and equipment have increasingly become more efficient per dollar value of investment, if changes in the price level are not considered. The division for 1939 is shown in Table 5.

Table 5
Expenditures for Plant and Equipment by Type, 1939

	\$ million	% of total
New construction & major alterations of buildings	391	29
New machinery & operations equipment	855	64
Plant & equipment acquired in a 'used' condition	78	6
Total	1,338	100

Census of Manufactures, 1939, I, 364.

LINE

1 Includes other fixed plant and structures.

3 From other owners and expenditures for land.

4 About 1 percent of the total is unclassified.

5) Technological changes in the 1930's were "directed primarily at improving the existing industrial technology in contradistinction to the earlier changes which tended to make the prevailing techniques and the existing equipment obsolete"³⁸ and, according to this view, brought about a decrease in the need and demand for new capital assets.

³⁷ For manufacturing and mining the average for 1919-21 was 51.0 percent; for 1927-29, 59.6 percent; for 1937-39, 64.1 percent (*Survey of Current Business*, April 1948, p. 14); for manufacturing alone, see Chawner's estimates, *Survey of Current Business*, March 1941, pp. 10, 11.

³⁸ David Weintraub, 'Effects of Current and Prospective Technological Developments upon Capital Formation', *American Economic Review*, Vol. 29 (1939), Part 2, pp. 15-32, refers especially to the increasing utilization of large-capacity equipment with resulting lower cost per unit of capacity and smaller floor space required per unit of capacity, the increasing importance of industrial measuring and controlling devices, improvements in the composition of metals, extending the life of equipment, chemical advances frequently accomplished without any or relatively small capital expenditures.

In the light of the above mentioned factors, the decrease in book values for net capital assets between 1929 and 1939 takes on a different aspect. Even if depreciation charges could be assumed to measure exactly the consumption of capital and if the original cost could be accurately adjusted for changes in the price level, an intertemporal comparison of the thus adjusted book values for capital assets, net, has only limited justification. It considers the volume of replacements and additions to be the decisive criterion. However, in a dynamic economy, 'replacement' actually in most cases means not replacement by identical producer goods, but replacement by producer goods of higher efficiency.³⁹ This fact is at the bottom of the discrepancy between the picture presented by measures of capacity or productivity and the one presented by book values.

Measures of productivity, such as horsepower or output per man hour, showed an increase of 25-30 percent between 1929 and 1939.

Horsepower: Electric motors of all manufacturing establishments increased from 34 million horsepower to 45 million; generating capacity similarly rose one-third. Total horsepower rose from 41.1 million to 50.5 million. Horsepower per 100 wage earners increased 30.8 percent.⁴⁰

Output per manhour: The Federal Reserve Board index of

³⁹ For an interesting analysis of the problem, see A. C. Pigou, 'Net Income and Capital Depletion', *Economic Journal*, Vol. 45 (June 1935), pp. 235-41, at 239: "Will depletion be offset by the manufacture of an element like the original element or by the engagement in creating capital of a quantity of resources equal to the quantity that was engaged on the original element? If the cause of the discarding is a valuation change, there can plainly be no question of reproducing the discarded element. . . . The right solution is . . . as follows. When any discarding has occurred, in order to make good the depletion of capital implied in it, that quantity of resources must be engaged which would suffice in actual current condition of technique to reproduce the discarded element. But the direction in which this quantity of resources is engaged should be determined without reference to what the discarded element has been; it should be so chosen that the maximum possible addition is made to the present value of the stock of capital."

⁴⁰ K. C. Stokes, 'Shifts in Installed Horsepower in Manufacturing', *Survey of Current Business*, Jan. 1943, p. 26.

industrial production for all manufacturing industries decreased slightly, from 110 in 1929 to 109 in 1939. This decrease, together with the drop in the number of full-time equivalent employees (from 10,428 thousand to 9,967 thousand)⁴¹ and the considerable shortening of the actual work week,⁴² explains why the index of manhours per unit of output fell 24 percent.⁴³ Output per manhour, it is true, is not a perfect yardstick for measuring the productive capacity of capital stock. Differences in the intensity of work performance have to be considered between periods of full employment and of considerable unemployment, as well as changes in the educational level and the distribution between skilled and unskilled labor. Another important variable is the amount of idle equipment or the degree of capacity utilization. Improvements in 'managerial' techniques also have to be kept in mind.⁴⁴

Measures of capital in terms of equipment show a different picture. Few data on equipment used by manufacturing industries are available. According to the *American Machinist*, which takes a quinquennial survey of machine tools owned by the metal working industries, the number of machine tools in place decreased more than 10 percent between 1930 and 1940, while tools over ten years old increased from 49 percent of the total number of tools in 1930 to 72 percent of the total number in 1940.⁴⁵ Was the smaller number of tools in place in 1940

⁴¹ *Survey of Current Business*, July 1947, Supplement, p. 36, Table 24.

⁴² From 48.3 to 37.6 hours for production workers in 25 manufacturing companies (NICB, *Economic Almanac*, 1948, p. 113).

⁴³ From 42 in 1929 to 32 in 1939 (Solomon Fabricant, *Employment in Manufacturing, 1899-1939*; NBER, 1942; p. 331). The increase in productivity and decrease in manhours per unit of product varied widely. Output per manhour increased 229 percent in the rayon industry but only 11 percent in bread and other bakery products (*Productivity and Unit Labor Cost in Selected Manufacturing Industries, 1919-1940*; BLS, 1942; pp. 90 and 6).

⁴⁴ On the latter point, see examples given by Weintraub, op. cit., pp. 15-16, 32, at p. 24. Important 'managerial' improvements during the depression brought about the reduction of floor space per unit of output or an increase in productivity with only modest, if any, capital expenditures.

⁴⁵ *American Machinist*, July 5, 1945, pp. 97-112; Dec. 6, 1945, pp. 105-20.

Table 6
Index of Machinery Production and Exports of Machinery,
1923-1946

	Index of machinery production (1935-39 av: 100)	Exports of machinery (monthly average; \$ million)
	(1)	(2)
1923	86	23.5
1924	81	25.9
1925	89	30.6
1926	102	33.3
1927	99	36.2
1928	106	41.1
1929	130	50.6
1930	100	43.0
1931	66	26.4
1932	43	11.0
1933	50	11.0
1934	69	18.2
1935	83	22.1
1936	105	27.9
1937	126	40.0
1938	82	40.6
1939	104	41.9
1940	136	56.1
1941	221	61.7
1942	340	63.5
1943	443	99.5
1944	439	123.1
1945	343	99.2
1946	240	114.0
Average 1923-29	99	34.5
Average 1930-39	83	28.2
Average 1940-46	309	88.2

Survey of Current Business, Supplement, 1942, p. 7 (1923-38); Supplement, 1947, pp. 10, 100.

COLUMN

- 1 Includes electrical machinery. The series begins in 1923.
- 2 Includes agricultural, electrical, metal working and other industrial machinery. Data in current dollars.

not more efficient than the larger number of tools available for 1930, owing to changes in quality? ⁴⁶

The annual average of machinery supplied in 1930-39 was about 16 percent less than in the seven-years 1923-29. For 1933-39, the decrease is only 11 percent (Table 6). The FRB

⁴⁶ See Andrew T. Court (General Motors Corporation, Labor Economics Section), in NICB, *Studies in Business Policy*, 15, pp. 14-7, at 15: "A . . . major advance in metal cutting technology began about 1930 with the introduction of tools tipped with tungsten carbide or similar carbide-composition cutting edges. Again, these cutting edges required new, more powerful, and more rigid

index for machinery includes machinery other than that used by manufacturing industries, it is true. Exports likewise would have to be deducted.⁴⁷ However, the proportion of total production going to domestic manufacturing industries presumably did not change sufficiently to affect the validity of the above comparison.

Data on the volume of domestic shipments (or similar information) concerning specific types of manufacturing equipment are usually not available, most series being given in dollars. The annual average of domestic shipments of industrial electric trucks and tractors, for example, decreased 25 percent between 1925-29 and 1935-39 (Table 7).

There was 144 percent more floor space in manufacturing buildings ten years old or less at the end of 1929 than at the end of 1939, according to Chawner's estimates of new floor space added in 1920-39.⁴⁸ Plant expenditures (1939 prices) were 78 percent bigger in 1920-29 than in 1930-39 (Table 4).

These data, as well as the decline in the proportion of total expenditures (plant and equipment) going into new plants,⁴⁹ clearly show a trend to the more 'intensive' building of factories; in other words, an increase of productive capacity per unit of floor space.

The value of 'Intangibles', including patents, in 1929 and 1939 cannot be compared because of lack of data for 1929. A

machine tools. Beginning about 1935, when the price of the new cutting material had dropped, many of the machine tools for the mass-production industries were built primarily to take advantage of the full capacity of carbide tips. The resulting increase in the effective rate of metal cutting probably offset the restrictive practices introduced by unions . . ."

According to a survey of machine tool users covering 251 plants employing 200,000 workers in 1938, of 11,610 machines purchased in 1936 and 1937, 4,666 were acquired for the specific purpose of replacing old ones and were substituted for 7,377 machines. As those were years of increasing production the total capacity of the machines used for replacement was presumably at least equal to that of the machines scrapped (Weintraub, *op cit.*, p. 22).

⁴⁷ Exports in 1939 amounted to approximately 10 percent of the value of products of the industrial groups 'Electric Machinery' and 'Machinery (except Electricaly'.

⁴⁸ *Survey of Current Business*, March 1941, p. 11, Table 2.

⁴⁹ *Ibid.*, pp. 10, 11, Tables I and 3.

Table 7
Shipments of Selected Durable Equipment, Number of Units,
1929-1946

MONTHLY AVERAGE	Mechanical stokers Sales ^a	Industrial electric trucks & tractors Domestic Shipments ^b	Furnaces, elec- tric, indus- trial (1,000 kw.) ^c
1929	n.a.	160	n.a.
1930	n.a.	90	n.a.
1931	n.a.	44	n.a.
1932	n.a.	20	n.a.
1933	143	42	n.a.
1934	178	47	n.a.
1935	193	71	n.a.
1936	281	97	4.7
1937	274	145	4.1
1938	201	56	1.4
1939	261	76	3.6
1940	235	131	10.1
1941	307	236	15.4
1942	375	364	40.9
1943	507	357	13.1
1944	323	365	10.9
1945	349	302	8.7
1946	340	226	6.6
AVERAGE			
1925-29	n.a.	119	n.a.
1933-39	219	76	n.a.
1936-39	254	94	3.5
1940-46	348	283	15.1

Survey of Current Business, Supplement, 1942, p. 145; Supplement, 1947, p. 155.

n.a.: not available.

^a Classes 4 and 5, i.e., for large commercial and high pressure steam plants. The reporting manufacturers produced approximately 95 percent of the total value of output of the industry in prewar years; since then nearly 100 percent.

^b Data cover the entire industry. The series begins in 1925.

^c Sales, comprising 85 to 95 percent of total sales for industrial purposes.

comparison of compiled book values for intangibles would not be very meaningful in any event, since many companies wrote down their intangibles to zero during the 1930's.

The sharp drop in 'Miscellaneous assets' is due mainly to the fact that the returns of corporations became more complete with respect to the definite allocation of their types of assets.⁵⁰

As for the liabilities of manufacturing enterprises in 1929 and 1939, the amount for accounts and notes payable within one year decreased substantially, paralleling the decrease in

⁵⁰ Intangibles were included in 'Miscellaneous assets' in 1929.

receivables, while long term debt increased about 10 percent in current dollars. The net effect was a decrease in the ratio of receivables to payables, from 0.8 to 0.6. Had the 1929 data not been deconsolidated—or if figures in *Statistics of Income* are compared—it would seem as though accounts and notes payable within one year had decreased only slightly.

Net worth decreased about 13 percent between 1929 and 1939, when amounts in current dollars are compared. When 1929 figures are deflated for changes in the price level, the drop is only about 3 percent. A comparison based on figures for 1929, which are not deconsolidated and reclassified, would obviously be erroneous as the raw 1929 figures include the assets of mining and trading companies consolidated in the income tax returns of manufacturing corporations. Such a comparison would show a more substantial decrease in net worth.⁵¹

The aggregate market value of the stock of all manufacturing corporations cannot be ascertained. A limited sample study concerning the ratio of the market value of stock to the book value of the net worth of manufacturing companies in 1939 and 1946 showed that the ratio varies considerably as between types of company, depending on size, industry, age, dividend record, and other factors.

The price index of 365 industrial stocks was 132.7 in December 1929, 97.6 in December 1939, 106.4 in December 1944, and 128.9 in December 1946.⁵²

2 Balance Sheet Items, 1939, 1944, 1946

Generally all balance sheet items, in current dollars (except capital assets and 'Other investments' which rose less) rose substantially between the end of 1939 and the end of 1944. When figures are deflated and the special character of the book values

⁵¹ The findings regarding cash, marketable securities, receivables, and payables are in harmony, as far as trends go, with Koch's findings from his sample of large manufacturing corporations (*The Financing of Large Corporations, 1920-39*).

⁵² 1935-39:100. Standard-Poor's *Trade and Securities Statistics, Security Price Index Record* (1948 ed.), p. 84.

for capital assets and 'Other investments' is considered, the trends are more similar. By the end of 1946 all items (after deflation for the continued rise in prices) except inventories, capital assets, and net worth, which continued to rise, had apparently declined again to an intermediary position between the 1939 and the 1944 level.⁵³

Holdings of liquid assets by manufacturing enterprises as a percentage of total assets were considerably higher in 1944 than in 1939, but by 1946 had declined to the 1939 level (after deflation for changes in the price level).

The increase between 1939 and 1944 was especially marked in the holdings of cash and deposits in banks, and even more so in investments in government obligations. Large concerns put most of the increase in liquid assets into government obligations, the smaller ones into cash. The accrued income tax liability of large, but not of small, concerns was covered by holdings of marketable securities.⁵⁴ Demand deposits, and presumably the total of cash and bank deposits, continued to rise after 1944, reaching a peak in July 1945; ⁵⁵ cash and bank deposits presumably declined to about \$12 billion at the end of 1946 (all in current dollars). Investments in government obligations declined from nearly \$12 billion (current) at the end of 1944 to presumably about \$8 billion at the end of 1946, paralleling the decrease in accrued taxes. The increase of notes and accounts receivable between 1939 and 1944 was somewhat milder, first because a considerable part of the 1944 output was sold to the federal government; secondly, because generally more cash purchases were made. Between 1944 and 1946 receivables presumably declined proportionately to sales. Trade credits mounted, it is true, despite the smaller sales, as larger amounts were going to civilians instead of government. On the

⁵³ Because of lack of data, 'Other investments' were assumed unchanged since 1944.

⁵⁴ F. C. Dirks, 'Wartime' Financing of Manufacturing and Trade Concerns', *Federal Reserve Bulletin*, 1945, pp. 313-30; see his Table 8 for the increase in net working capital for all size groups in 1940-43.

⁵⁵ *Federal Reserve Bulletin*, 1947, p. 691, Table 4.

other hand, these increases were probably offset by payments due from the federal government.⁵⁶

Inventories were about one-third higher in 1944 than in 1939 (after deflation for changes in the price level). More than two-thirds of the increase between 1939 and 1943 was due to larger stocks of goods held by the war industries. Even so, inventories of nonwar industries were nearly 15 percent higher in 1943 than in 1939 (after deflation for changes in the price level) (Table 2). In both 1944 and 1945 there was a decrease of more than \$1 billion (after inventory valuation adjustment), due to the liquidation of war inventories.⁵⁷ During 1946 stocks were replenished with peacetime goods, so that inventories at the end of 1946 were about 40 percent higher than at the end of 1939 (in 1939 dollars). In the third quarter of 1946 inventories were approximately evenly distributed between durable and nondurable goods industries.⁵⁸

Book values of 'Other investments' increased about 22 percent (in current dollars) between 1939 and 1944, half of the increase occurring in 1944. Interest payments received by corporations, other than on government obligations, amounted to \$117 million. Dividend payments received in 1944 by corporations from domestic corporations amounted to \$394 million, from foreign corporations to \$92 million.⁵⁹ The latter amount, even in current dollars, was smaller than the corresponding amount for 1939; the decrease was due to war conditions. No dividend payments were received in 1944 from corporations in Germany, Japan, or enemy-occupied countries.

Tangible capital assets, gross, increased at least \$12 billion between 1939 and 1944 (Tables 1 and 4).⁶⁰ Total net capital

⁵⁶ See D. Stevens Wilson, 'Planned Capital Outlays and Financing', *Survey of Current Business*, July 1945, pp. 15 ff., at 17. Receivables of all business enterprises were estimated to have increased considerably in 1946 (*Federal Reserve Bulletin*, 1947, pp. 487-97).

⁵⁷ *Survey of Current Business*, July 1947, Supplement, p. 45, Table 33.

⁵⁸ *Federal Reserve Bulletin*, 1947, p. 490.

⁵⁹ Figures presented in *Statistics of Income* are not adjusted for the consolidated character of part of the returns.

⁶⁰ Additions to property account, in 1940-42 especially, were due also to transfers from surplus and idle property to active property (e.g., General Motors).

assets increased nearly 10 percent.⁶¹ The actual net increase in manufacturing plant and equipment was much larger. First, most new facilities were built with government funds, only part of which appeared on the balance sheets in 1944 or 1946.⁶² Private new industrial construction (excluding land and equipment) in 1940-44 amounted to only \$2 billion, while public new industrial construction amounted to \$7 billion.⁶³ Private expenditures on new manufacturing plant and equipment were about \$13 billion (Table 4); expenditures by the government were about \$14 billion (the latter between July 1940 and June 1945).⁶⁴ Approximately 75 percent of government expenditures went into privately operated plant and equipment, including plants operated on a fee basis by private concerns.

While some of these new facilities will be owned permanently by the federal government, others have proved to be of commercial value since the war. Contracts for the construction of such facilities contained an option for their subsequent purchase by the private operating concern. Sales of war production (manufacturing) facilities between VE-Day and June 30, 1947 amounted to \$1.7 billion in cost value, \$0.7 billion in terms of sales price. To this must be added sales to manufacturing enterprises of goods classified as 'Capital equipment and related items', amounting to \$300 million or more. These purchases seem to have been made at prices below current market prices. The process of surplus property disposal was not completed in

⁶¹ The proportion of cash and other current assets to depreciation reserves was more favorable than in 1939; this may indicate that part of the reserves had been accumulated in a real sense.

⁶² General Motors, for example, excluded from its capital assets plant and equipment used in producing war materials, supplied by, or for which the company was being reimbursed by United States, Canadian, or British government agencies. On December 31, 1946 it was custodian of plant facilities in the amount of \$88 million, i.e., 14 percent of the capital assets, net, appearing on its balance sheet.

⁶³ Bureau of Foreign and Domestic Commerce, 'Construction and Construction Materials', *Industry Report*, Statistical Supplement, May 1947, pp. 4 and 8.

⁶⁴ *Facilities Expansion, July, 1940-June, 1945* (Civilian Production Administration, Jan. 16, 1946), p. 10, Table 8.

June 1947, when more than \$2 billion worth (cost value) of manufacturing property remained to be disposed of. Although generally not or not easily convertible plant, these facilities must be kept in mind when appraising the manufacturing capacity of the country.⁶⁵

Secondly, some of the facilities constructed during the war by private companies were depreciated at a considerably higher rate than would have expressed the actual decline in commercial value.⁶⁶ Additions to manufacturing plant and facilities constructed or acquired under certificates of necessity amounted to \$4.4 billion by June 30, 1945,⁶⁷ i.e., about 30 percent of total private expenditures on manufacturing plant and equipment since 1940. This overstatement of depreciation tends to be offset by two factors: the Bureau of Internal Revenue may not have fully recognized the increased activity factor with respect to equipment not specially procured for defense production;⁶⁸ annual additions to depreciation reserves of prewar assets are understated, or rather insufficient to cover replacement costs.⁶⁹

Most of the new expenditures on plant and equipment during the war were in the metal, munitions, chemical, ship-building, and aircraft construction industries, which largely continue to use the equipment. Differences between the various industries are due also to the different paces of technological advance.

Private expenditures for new manufacturing plant and equipment in 1945 and 1946 were more than \$9 billion (Table

⁶⁵ J. B. Epstein, 'War Surplus Disposals', *Survey of Current Business*, Oct. 1947, p. 15, Tables 6 and 7; also, *Federal Reserve Bulletin*, 1947, pp. 487-97.

⁶⁶ In some cases adjustments of wartime amortization resulted in a net increase in capital assets, net, of as much as 8 percent; see, for example, Douglas Aircraft Company, *Annual Report*, 1945, p. 13.

⁶⁷ Civilian Production Administration, 'Facilities Expansion', Jan. 16, 1946, p. 12.

⁶⁸ A maximum increase of 50 percent was granted (Kimmel, p. 32).

⁶⁹ George Terborgh estimates that of \$4 billion reported by corporations as depreciation for tax purposes, \$3 billion applies to prewar assets, and that annual depreciation of these assets is understated by \$1.5 billion (NICB, *Studies in Business Policy*, 27, p. 17).

4). Private industrial construction (excluding land and equipment) cost \$2.3 billion.⁷⁰

The increase in book values of net capital assets 1939-46 was about 20 percent presumably (Table 1, line 6). In evaluating this rise two factors in addition to those outlined in the preceding pages should be borne in mind:

The ratio of equipment expenditures to total new plant and equipment outlays continued to rise. In this way, total expenditures for plant and equipment have become even more efficient per dollar value of investment than before the war.⁷¹ During the war and immediately after, numerous and highly important improvements in machinery and production techniques were made. The WPB's Office of Production Research and Development listed 800 new methods or improvements that it disseminated to manufacturers.⁷² The significance of these changes and improvements for the value of the total stock, including the part acquired before the war, is difficult to appraise. The decisive question seems to be whether the majority of the new methods introduced permit utilization of the old stock, thereby rendering it more efficient, or whether, on the contrary, the new inventions made obsolete a large part of the prewar assets. In the opinion of tool engineers, for example, the tools that helped the United States win World War II were already obsolete by March 1948.⁷³

⁷⁰ Bureau of Foreign and Domestic Commerce, op. cit., p. 4.

⁷¹ For manufacturing and mining the ratio was 64.1 percent in 1937-39 and 72.4 percent in 1945-47 (*Survey of Current Business*, April 1948, p. 14).

⁷² See Walker, 'American Productivity', *Fortune*, Jan. 1946, pp. 150-6, Feb. 1946, pp. 131-3, for a summary of industrially significant inventions.

⁷³ *New York Times*, March 16, 1948, p. 41. For an accountant's view of the matter, see W. H. Franklin, 'Productivity in Relation to Costs', *NACA Bulletin*, Vol. 28, No. 14 (March 15, 1947), pp. 859-68, at pp. 862-3: "Even though accountants have tended to use what might be considered high depreciation rates, I do not feel they have been in many cases nearly high enough. We are all of us too apt to look only at the physical life and discount the vastly more important probability, if not certainty, of early obsolescence. It is possible that many facilities are in use today, even though obsolete, because a sufficiently high enough depreciation rate has not been used."

For the opposite view, see Dirks, 'Postwar Capital Formation and Its Financing in Manufacturing and Mining Industries', Federal Reserve Board, *Postwar*

The 20 percent rise in net book values between the end of 1939 and 1946 compares with indicators of productive capacity as follows:

- 1) The generating capacity of industrial establishments for own use had already risen about 20 percent in 1945,⁷⁴ before expenditures of \$6 billion on new manufacturing plant and equipment in 1946 (Table 4).
- 2) Output per manhour increased about 5 percent on the average for all manufacturing industries between 1939 and 1946.⁷⁵ The index of manufacturing production rose as much as 62 percent, it is true. But this rise was accompanied by a more than 40 percent increase in the labor force and a lengthening of the average work week from 37.7 to 40.4 hours.

Especially as concerns 1939-46 it is doubtful that output per manhour is an appropriate index for the productivity of total capital stock. Changes in the composition of the labor force and in labor practices, as well as the accuracy of the index may affect the picture.⁷⁶ Furthermore, surplus property which was being sold to manufacturing industries during 1946 without (or without fully) participating in the manufacturing process in that year is not included in the index. The same is true, of course, for plant facilities under construction during 1946.

According to a survey by McGraw-Hill, manufacturing companies had completed 64 percent of their postwar expansion

Economic Studies 5, p. 11: "More or less offsetting the price consideration is the possibility that the increased technological effectiveness of new materials and types of equipment in many lines may have compensated for changes in the dollar cost of like amounts of physical capacity."

⁷⁴ From 10.6 million kilowatts in 1939 to 12.7 million in 1945 (*Statistical Abstract of the United States, 1946*, p. 814, Table 931). These data include only establishments with capacities of 100 kilowatts or more. In view of the increase in the importance of small establishments in the 1940's, the change was presumably much larger.

⁷⁵ Output per manhour in the rayon industry increased as much as 51 percent between 1939 and 1945; in the ice cream industry 53 percent; in several industries it fell (BLS, *Productivity and Unit Labor Cost in Selected Manufacturing Industries, 1939-1945*, May 1946, pp. 9, 7).

⁷⁶ See Frank R. Garfield, 'Measurement of Industrial Production Since 1939', *Journal of the American Statistical Association*, Vol. 39 (1944), pp. 439-54, and the literature he cites on p. 439, n. 1.

program by 1948. Under the program as a whole, capacity was expected to be 52 percent higher than in 1939.⁷⁷

3) At the beginning of 1945, 70 percent more machine tools were used by private metal working industries and owned by the federal government than at the beginning of 1940.⁷⁸ Tools over ten years old declined from 72 percent of the total number of tools in 1940 to 38 percent in 1945 (if tools owned by the federal government are included); 54 percent (if tools owned by the federal government are not included). Production equipment other than machine tools increased 55 percent (including equipment owned by the federal government). In 1940, 65 percent of the equipment was over 10 years old; in 1945, only 39 percent (60 percent if equipment owned by the federal government is not included).⁷⁹

The doubling of accounts payable between 1939 and 1944 paralleled the increase in production (in current dollars). The ratio of receivables to payables (accounts payable, bonds, and notes payable) was about the same in 1944 as in 1929 (0.8). Bonds, notes, mortgages payable with a maturity of less than one year rose more than those with a maturity of more than one year. If the higher price level of 1944 is taken into consideration, the two items together decreased slightly since 1939. This, of course, reflects the stronger financial position of manufacturing enterprises in 1944 due to high wartime profits, part of which had been used to retire debt in 1942 and 1943. Between 1944 and 1946 accounts payable presumably decreased because of the smaller volume of business. Bonds, notes, and mortgages payable amounted to about \$10 billion in 1944 and 1946.⁸⁰ They were at a lower level, in dollars of constant purchasing power, in 1946 than in 1939. All bank loans (by members of the Federal Reserve System) outstanding on November 20, 1946 from

⁷⁷ *Business Week*, Feb. 7, 1948, pp. 65-72.

⁷⁸ More than a third of the total number of machine tools in place in 1945 were owned by the federal government.

⁷⁹ *American Machinist*, July 5, 1945, pp. 97-112; Dec. 6, 1945, pp. 105-20. Of course, the decade figure is not a perfect measure of obsolescence.

⁸⁰ Wilson, p. 19.

Table 8
Current Assets and Liabilities of 812 Registrants with the SEC
Classified as 'Manufacturing', 1943, 1944, 1946
(millions of current dollars)

	1943	1944	1946
Cash on hand & in banks	5,940	5,832	5,264
U.S. tax & savings notes	2,731	2,751	1,096
Other U.S. govt. securities	2,680	3,734	3,007
Other marketable securities	173	175	136
Receivables from U.S. govt.	3,761	3,536	328
Other notes & accounts receivable	3,160	3,201	4,399
Inventories	9,685	9,551	11,596
Other current assets	100	102	413
Total current assets	28,230	28,882	26,212
Notes payable to banks	1,000	1,219	875
Advances & prepayments, U.S. govt.	1,715	1,455	73
Other trade notes & accounts payable	3,049	3,133	3,035
Federal income taxes accrued	5,694	5,328	2,389
Other taxes accrued	757	764	509
Renegotiation provisions	956	561	61
Other current liabilities	1,323	1,377	1,427
Total current liabilities	14,494	13,837	8,369

SEC, *Statistical Series*, Supplement to Release 775, June 26, 1947, Table 2.

manufacturing enterprises amounted to approximately \$5 billion; loans with an initial maturity of more than one year to about \$2 billion. To this must be added nearly half a billion for loans by nonmember banks.⁸¹

'Other liabilities' rose from \$2.2 billion in 1939 to almost \$15 billion (current) in 1944, and presumably amounted to about \$8 billion (current) in 1946. These sharp fluctuations are due to three factors:

1) The largest item embraced in 'Other liabilities' during the war was accrued income tax liabilities, estimated to be more than \$10 billion at the end of fiscal 1944.⁸² Federal income taxes, accrued, of 812 manufacturing corporations registered with the Securities and Exchange Commission amounted to \$5.3 billion at the end of 1944, declining to \$2.4 billion by the end of 1946 (Table 8).

⁸¹ For details, see Duncan Holthausen, 'Term Lending to Business by Commercial Banks in 1946', *Federal Reserve Bulletin*, 1947, pp. 498-517, at 504; Charles Schmidt, 'Member Bank Loans to Small Business', *ibid.*, pp. 963-78, at 965.

⁸² Wilson, p. 18.

2) 'Provisions for war and postwar adjustments' also helped to swell 'Other liabilities' in 1944 as well as in the other war years. Some companies, e.g., E. I. du Pont de Nemours, doubled their reserves for contingencies between 1939 and 1944, and kept them at a high level through 1946. Other companies, e.g., Douglas Aircraft, restored substantial amounts that had been booked under 'contingencies' during the war to surplus in 1946.

Reserves for contingencies during the war were increased partly because of the general uncertainty regarding the postwar situation, partly for special reasons. For example, Eastman Kodak and many other companies charged investments in subsidiaries and branches in war areas to reserve for contingencies. These amounts were at least partly recovered by the end of 1946.

Higher replacement costs of capital assets were another reason for increasing reserves. According to a survey of business practices by the National Industrial Conference Board, "one out of seven companies has established special reserves out of earnings after taxes to provide at least in part for the higher cost of replacement".⁸³ Replacement reserves, however, have not been recognized as deductible by the Bureau of Internal Revenue.⁸⁴

3) Government contract advances and liabilities under renegotiation agreements were substantial in 1944, but had been nearly eliminated by 1946 (Table 8).

Net worth increased from \$46 billion in 1939 to \$67 billion in 1944 and to nearly \$73 billion in 1946 (\$60 and \$61 billion after deflation of the balance sheet items). The increase since 1944 is due partly to the methods of accounting, according to which exceptionally large amounts were booked under 'con-

⁸³ *Conference Board Business Record*, Aug. 1947, p. 231. See also W. A. Cooper, 'An Integrated Plan for Postwar Reserve Allowances', *Journal of Accountancy*, Vol. 76 (1943), p. 192.

⁸⁴ Note the distinction between valuation reserves and surplus reserves made in 'Postwar Expenses Related to Wartime Income', *Revenue Revision of 1943*, Hearings before the Committee on Ways and Means, 78th Cong., 1st Sess., p. 135.

tingencies' during the war and restored to surplus in 1946.⁸⁵ To this extent, net worth is understated for 1944.⁸⁶

⁸⁵ In view of Section 102 of the Internal Revenue Code, some concerns have refrained from building up surplus rapidly

⁸⁶ For data by asset size groups, and durable and nondurable goods industries, see Dirks, *Federal Reserve Bulletin*, 1945, pp. 313-30; A. R. Koch and E. J. Stockwell, 'The Postwar Financial Position of Business', *ibid.*, 1946, pp. 1335-44; Warner and Koch, 'Financial Developments among Large Manufacturing Corporations, 1945', *ibid.*, pp. 1106-14. See also A. R. Koch and C. H. Schmidt, 'Financial Position of Manufacturing and Trade in Relation to Size and Profitability, 1946', *ibid.*, 1947, pp. 1091-102.

APPENDIX

A *Affiliations with Subsidiaries*

Corporations owning nearly two-thirds of total assets of all manufacturing corporations had affiliations with subsidiaries in 1929 that made it advisable to file a consolidated return for the affiliated group. In 1939 the privilege of filing a consolidated return was not open to not fully consolidated groups of manufacturing corporations.

The degree and character of the consolidation of registered manufacturing corporations at the end of the 1930's can be gathered to some extent from balance sheet data based largely on consolidated statements and published by the Securities and Exchange Commission. In 1937 only 293 of 1,021 registrants in the 'manufacturing' group had no subsidiaries (Table 9). It has been the practice of the SEC to accept consolidated statements whenever submitted by registrants.¹

For 1937 alone is information available on the number, character—domestic or foreign, active or inactive, consolidated or not—and distribution of subsidiaries of registrants with the SEC in 'manufacturing' and all its subgroups. For other years similar information is available only for individual registrants.

¹ *Statistics of American Listed Corporations*, Part 2, pp. 21-2.

Table 9
Number and Types of Subsidiaries, 1937
(Based upon statements of 1,961 registrants with the SEC classified
as 'manufacturing')

Number of Registrants ^a	
Total	1,021
Without subsidiaries	293
With subsidiaries	
No active subsidiaries	67
1-10 active subsidiaries	542
11-20 active subsidiaries	52
21 or more active subsidiaries	67 ^b
Number of Subsidiaries ^c	
Total	7,804
Domestic and foreign consolidated	5,335
Domestic and foreign active	6,103
Domestic, total	5,763
Of which 95% & over are controlled ^d	4,395
Foreign, total	2,041
Of which 95% & over are controlled ^d	1,534
Domestic inactive, total	1,425
Of which 95% & over are controlled ^d	1,241

SEC, *Statistics of American Listed Corporations*, Part 1, pp. 160-1, 163-4.

^a Excluding registrants that are consolidated or unconsolidated subsidiaries of other registrants. Consolidated subsidiaries are those in which the registrant owns directly or indirectly more than 50 percent of the voting stock and that were included in the registrant's consolidated statements. Subsidiary refers to an affiliate controlled by the registrant directly, or indirectly through one or more intermediaries

^b Steadily declining numbers in the brackets 21-30, 31-50, 51-100, 101 and more.

^c Including registrants that are consolidated or unconsolidated subsidiaries of other registrants.

^d 95 percent and over are controlled by intermediate parent. The remainder is less than 95 percent controlled or the percentage of control was not indicated in the report. The degree of control by the immediate parent is measured by the percentage of voting power represented by securities of the subsidiary owned by the immediate controlling parent.

The figures for 1937 may give an approximate picture of the situation in 1939. The increase of investments in affiliates from 3.2 percent of net worth in 1937 to 4 percent in 1939 may indicate a trend toward expansion and stronger consolidation. However, it may be due partly to a change in accounting practice as a result of war conditions: some companies did not consolidate various foreign subsidiaries that had been consolidated in prior years.²

² Ibid., p. 7, n. 1.

More than a fourth of all subsidiaries were incorporated abroad. Most inactive subsidiaries were domestic. The average number per registrant in the manufacturing group reporting active subsidiaries was 9.2. The smallest registrants, i.e., with assets of less than \$1 million, averaged only 2.4 active subsidiaries per registrant for all industries; the corresponding figure for registrants with assets of \$500 million and over was 72.6.³

Direct subsidiaries—active and inactive, domestic and foreign—represented 74 percent of the total in 'manufacturing', the remainder being two or more steps removed; the corresponding percentage for domestic active subsidiaries was 78.5. For all industries, registrants with assets of less than \$1 million directly controlled 93 percent of the total number of their subsidiaries, while the corresponding percentage for registrants with assets of \$500 million and over was 52.⁴

The total assets of the 1,030 registered companies (including their consolidated subsidiaries) that were classified by the SEC statistics as manufacturing, amounted to 58 percent of the assets of all corporations classified as manufacturing in *Statistics of Income for 1939*. If the SEC data are adjusted to allow for the overstatement due to the different industrial classification and for the consolidated character of the statements, this percentage is reduced to about 51. The adjustment is based on the assumption that total assets are decreased 12 percent after deconsolidation and reclassification, a percentage computed for the corporations that submitted consolidated returns for 1933 (Table 10).

At the end of 1943 the total assets of 1,087 corporations registered with the SEC amounted to 52.6 percent of the total assets of all corporations classified as manufacturing in *Statistics of Income for 1943*.⁵ After deconsolidation and reclassification

³ *Statistics of American Listed Corporations*, Part I, presents data also on subsidiaries by asset size groups of registrants, but not classified by industry groups.

⁴ *Ibid.*, pp. 29-30, 160-1, 163, 164.

⁵ Comparable data for 1944 have not been published by the SEC.

Table 10: Effect of Deconsolidation in 1934 on Manufacturing Corporations (millions of dollars)

RETURNS CONSOLIDATED IN 1933										RETURNS NOT CONSOLIDATED IN 1933				
	Change 1933-34					Change 1933-34					Effect of De- consoli- dation as % of			
	as % of					as % of								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)		(11)		
Cash	1933 ^a (1)	1934 ^b (2)	1,613	95	6.25	1,248	-270	-17.79	1,567	1,758	191	12.19	-24.1	
Notes & acct. rec.	3,510	6,969	3,459	98.55	4,274	764	21.77	3,255	3,209	-46	-1.41	23.2		
Inventories	3,792	4,062	270	7.12	3,770	-22	-0.58	4,292	4,549	257	5.99	-7.6		
Investments, tax-exempt	710	696	-14	-1.97	517	-193	-27.18	1,273	1,086	-187	-14.69	-25.2		
Investments, other	6,681	12,601	5,920	88.62	5,307	-1,374	-20.57	2,817	2,747	-70	-2.48	-18.1		
Capital assets	14,403	13,136	-1,267	-8.79	10,698	-3,705	-25.72	9,982	9,753	-229	-2.29	-16.9		
Other assets	1,712	2,334	621	36.27	1,494	-218	-12.73	2,241	2,112	-129	-5.76	-7.0		
Total assets	32,326	41,411	9,084	28.11	27,308	-5,019	-15.53	25,427	25,215	-212	-0.83	-11.6		
Notes & acct. pay.	2,870	6,797	3,927	z	3,912	1,042	36.31	2,852	2,855	3	0.105	36.2		
Bonds, mortgages	3,496	3,674	178	z	2,577	-919	-26.29	1,525	1,448	-77	-5.05	-21.2		
Other liabilities	2,103	2,802	699	z	1,858	-245	-11.65	1,564	1,721	157	10.04	-21.7		
Capital stock	16,545	19,798	3,253	z	13,382	-3,163	-19.12	13,853	13,549	-304	-2.19	-15.2		
Surplus less deficit	7,311	8,340	1,029	z	5,579	-1,732	-23.69	5,632	5,642	10	0.18	-15.2		
Total liabilities	32,326	41,411	9,084	28.11	27,308	-5,019	-15.53	25,427	25,215	-212	-0.83	-11.6		

Table 12, pp. 162-3. 'Unconsolidated' in notes b-e, except for fiscal year companies.

a Unconsolidated returns for corporations not reporting on a consolidated basis in 1933, by their 1933 industrial classification, ibid., Table 11, p. 154.

* Unconsolidated returns for corporations not reporting on a consolidated basis in 1933, by their 1934 industrial classification, ibid., Table 12, p. 170.

† Not needed for computing col. 12.

* Consolidated returns for corporations submitting balance sheets and reporting on a consolidated basis in 1933, by their 1933 industrial classification; *Statistics of Income for 1934*, Part 2, Table 11, p. 146.

b Unconsolidated returns for corporations reporting on a consolidated basis in 1933, by their 1933 industrial classification, ibid., Table 14, p. 186.

* Unconsolidated returns for corporations reporting on a consolidated basis in 1933, by their 1934 industrial classification, ibid.,

tion of the SEC data and the consolidated data in *Statistics of Income*, the percentage is reduced to about 47%.⁶

B *Relative Importance of Corporate and Noncorporate Enterprises*

Noncorporate enterprises decreased in relative importance between 1929 and 1939. In 1929 noncorporate enterprises accounted for 8.1 percent of the total value of product of manufacturing enterprises; in 1939 for only 7.4 percent. Inventories held by noncorporate enterprises similarly declined about 1 percent, from nearly 7 percent at the end of 1929 to nearly 6 percent of total inventories at the end of 1939.⁷

Data on the value of product of noncorporate enterprises are not available for years since 1939. Operating manufacturing firms increased from more than 214,000 at the end of 1939 (236,000 at the end of 1944) to more than 305,000 at the end of 1946 (Table 11) apparently because of the growth of the noncorporate sector.⁸

⁶ Comparisons of SEC and *Statistics of Income* balance sheet data for the manufacturing group are rather hazardous, mainly because of differences in classification arising from the use of consolidated statements in the SEC statistics, on the one hand, and the use of unconsolidated statements in *Statistics of Income for 1939* and the small importance of consolidated statements submitted to the Bureau of Internal Revenue for 1944, on the other. In general, the end product or operation (determined in most cases by the principal source of gross revenue) was the basis of industrial classification for the SEC data. This resulted in an understatement of the number of companies engaged in certain primary activities. For example, many of the leading metal mining companies appear among manufacturing industries. Furthermore, since the unit of classification was the company and its consolidated subsidiaries, several companies generally reported as holding companies whose assets consisted mainly of securities of operating subsidiaries were classified as operating companies (*Statistics of American Listed Corporations*, Part 1, pp. 6-7; Part 2, pp. 7-8). These methods of industrial classification and the consolidated character of the statements submitted to the SEC lead to an overstatement of net assets, total assets, and all other balance sheet items except receivables and payables.

⁷ The percentage for 1929 in Table 11 was derived from consolidated data. The percentage given here was computed after deconsolidation.

⁸ The number of manufacturing corporations filing income tax returns declined from 86,183 in 1939 to 76,619 in 1944.

Table 11
Corporate and Noncorporate Manufacturing Enterprises,
1929, 1939, 1944, 1946
(millions of current dollars)

	1929	1939	1944	1946
1 Corporate profits before taxes	5,038	3,712	13,741	10,858
2 Income of unincorporated enterprises	512	378	1,536	1,906
3 Line 2 as % of line 1 plus 2	9.2	9.2	10.1	14.9
4 Inventories, noncorporate as % of total	6.4	5.8	n.a.	n.a.
5 Value of product, noncorporate as % of total	8.1	7.4	n.a.	n.a.
6 No. of operating business firms (000)	211.0 ^a	214.2 ^b	236.2 ^b	305.1 ^c
7 No. of active proprietors of unincorporated enterprises (000)	133	124	133	164

n.a.: not available.

^a Number of establishments or groups of establishments under the same management and in the same city, classified as manufacturing by the Census of 1929.

^b September 30.

^c December 31.

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1-2 *Survey of Current Business*, July 1947, Supplement, Tables 16-17.

4 Computed from Table 14 (1929 and 1939).

5 *Census of Manufactures, 1939*, I, 228-30.

6 Col. 1. *ibid.*, 1929, I, 95, Table 2; col. 2 and 3: *Survey of Current Business*, Jan. 1947, p. 18, Table 6; col. 4: *ibid.*, Sept. 1947, p. S-3.

7 *Economic Almanac for 1948*, p. 77.

Demand deposits owned by noncorporate manufacturing and mining enterprises increased from about 9 percent of demand deposits owned by both corporate and noncorporate enterprises at the end of January 1945 to 10.5 percent on February 26, 1947.⁹

C Method of Computations

1 Data for All Corporations

Statistics of Income presents balance sheet data for all corporations submitting complete balance sheet data. These data were raised to comprise *all* active corporations on the basis of the ratio of "taxes paid other than income tax" by all corporations divided by "taxes paid other than income tax" by balance sheet corporations.

⁹ *Federal Reserve Bulletin*, 1945, p. 332; *ibid.*, 1947, p. 690.

For 1929 data on "taxes paid . . ." by balance sheet corporations are not given in *Statistics of Income*. Hence the ratio prevailing in 1931, the first year for which such information is available, was projected back to 1929.

The ratio was 1.0083 in 1931, 1.0088 in 1939, and 1.008 in 1944. In other words, the compiled balance sheet data in *Statistics of Income* did not have to be raised by more than about 1 percent, so that any deficiencies in the method are presumably irrelevant.¹⁰

In any event, this method seems preferable—for the purposes of this study—to raising balance sheet data to cover all corporations on the basis of data on gross sales; for the ratio of gross sales to total assets is larger for small corporations, which do not submit balance sheets, than for others. Even on the basis of gross sales, the compiled balance sheet data in *Statistics of Income* would have to be raised only slightly more than 1 percent.¹¹

In computing net changes in inventories, Kuznets raised the figures for inventories held by corporations submitting balance sheets to comprise all corporations on the basis of data for costs of goods sold.¹² For computing inventories this method may be preferable to the one applied uniformly to *all* balance sheet items in this study. Kuznets' estimate of inventories held by all manufacturing corporations at the end of 1929 differs from ours because (a) a different ratio was used and (b) Kuznets' estimate is the sum of the estimates for each minor industrial group.¹³

¹⁰ The same ratio was applied to all balance sheet items although the distribution of assets and liabilities of small corporations not submitting complete balance sheet data may not be the same as that of the others, on the average. Also, figures on "taxes paid other than income tax" in *Statistics of Income* are slightly incomplete; see C. J. Hynning, *Taxation of Corporate Enterprise* (TNEC Monograph 9, 1941), p. 135.

¹¹ Compare C. A. Bliss, *The Structure of Manufacturing Production* (NBER, 1939), App. VI, pp. 204-6.

¹² *Commodity Flow and Capital Formation* (NBER, 1938), I, Table VII-2, Note A.

¹³ Kuznets' 1929 figure (in current prices) for inventories held by manufacturing corporations is about 0.5 percent larger than our estimate.

2 Changes in Industrial Classification

The industrial classification in *Statistics of Income* was not changed between 1939 and 1944 in any way that would have affected the entire 'manufacturing' group, but several industrial activities were shifted from 'manufacturing' to other groups, and vice versa, between 1937 and 1938.¹⁴ The sole major change was the transfer of 'ship and boat building' from 'construction' to 'manufacturing.' The gross income of corporations classified under 'ship and boat building' in 1929 was computed as a percentage of the gross income of all manufacturing corporations and this percentage (0.15 percent) added to the balance sheet data for all corporations classified as 'manufacturing' in 1929.¹⁵

3 Deconsolidation and Reclassification of the Data for 1929 and 1944

In the middle of the decade 1929-39 the nature of the statistical data available changed fundamentally because of the withdrawal, in 1934, of the privilege enjoyed by corporations under certain conditions to file consolidated income tax returns.

¹⁴ Industrial activities not included in 'manufacturing' in 1929, but in 1938 and the following years: salt (except mining of rock salt), logging, publishing directories and time tables, natural ice, retreading tires, ship and boat building.

Industrial activities included in 1929, but not in 1938 and the following years: roasting and shelling nuts, repairing of machinery, mineral and spring water bottling, armature rewinding, welding, blocking and renovating hats, publishers' representatives (*Statistics of Income for 1938*, Part 2, pp. 243 ff.).

No data are presented on these activities in *Statistics of Income* or the *Census of Manufactures*. According to the *Census of Manufactures, 1929*, the value of product of corporate enterprises classified under 'Salt, obtained by mining or evaporation' was only about 0.05 percent of the total corporate product.

¹⁵ Instead of computing the gross income of corporations classified under 'ship and boat building' as a percentage of the gross income of all manufacturing corporations, it could be computed as a percentage of the gross income of the 'construction' group; then the balance sheet data of corporations engaged in ship and boat building could be estimated on the basis of the balance sheet data for 'construction'. The difference in the amounts for total assets of 'manufacturing' as defined in 1939 is negligible. For other balance sheet items the differences are somewhat larger.

Subsidiaries that had until then been unavoidably classified with the parent corporation, although actually engaged in differently classified lines of business, were now classified separately. The problem was to find the percentages that had to be deducted from or added to the otherwise adjusted balance sheet data of manufacturing corporations in 1929 to make the 1929 figures comparable with the 1939 figures. This entailed, among other things, use of figures for 1929 adjusted to represent a situation as if the privilege of filing consolidated returns had not existed in 1929.

For 1933 and 1934 separate data are available for corporations that did and did not file consolidated returns in 1933 (Table 10). The percentage changes in the balance sheet data for 1933 due to the deconsolidation and the ensuing industrial reclassification of subsidiaries were estimated after deducting changes caused by economic factors (temporal changes) between December 31, 1933 and December 31, 1934. It was assumed here, in the absence of data to the contrary, that purely temporal changes affected corporations filing and not filing consolidated returns in the same way. For example, it was assumed that 'investments, other' of both corporations filing and not filing consolidated returns would have decreased 2.48 percent (Table 10, col. 11), the amount of the temporal change between 1933 and 1934. 'Investments, other' of corporations filing consolidated returns in 1933 decreased 20.57 percent (col. 7), because of temporal changes, deconsolidation, and reclassification. The difference between 20.57 and 2.48 percent, or 18.1 percent (col. 12) is consequently the decrease that can be attributed to deconsolidation and reclassification.

For 'cash', 'inventories', 'investments, tax exempt', and 'capital assets', it was not considered necessary to resort to the assumption explained in the preceding paragraph. It is believed that deconsolidation as such (without industrial reclassification) did not affect these items, and that the temporal changes are therefore directly expressed by columns 3 and 4.¹⁶

¹⁶ Total assets were computed as the sum of all assets, and net worth as a residual.

Table 10, column 12, presents the approximate percentage changes due to deconsolidation and reclassification in 1933, after temporal changes were taken into account.¹⁷ In applying these percentage changes to 1929 data, the following facts must be kept in mind:

a) Fewer consolidated returns were filed beginning in 1932 when higher income tax rates were applicable to consolidated returns (Table 12).¹⁸

b) Mergers and acquisitions occurred in manufacturing for various reasons between 1929 and 1933 (Table 3). Some were presumably prompted by the discontinuation of the privilege of filing consolidated returns. For these reasons the relative size of the segment of manufacturing corporations that filed consolidated returns declined from 63.3 percent in 1929 to 54.2 percent in 1933, in terms of "taxes paid except income tax". Consequently, the percentage changes due to deconsolidation and reclassification found for the corporations that

¹⁷ Because of the nature of the data, these percentages are somewhat smaller than they would be if deconsolidation in 1934 had been complete. Fiscal-year companies were permitted to file consolidated returns in computing their 1934 income tax, and the new rule applied to them only from 1935 on. Consequently, the data for 1934 in Table 10 for corporations that had filed consolidated returns for 1933 include consolidated returns for 1934 by corporations with fiscal years ended before December 31, 1934. The gross income of manufacturing corporations that filed consolidated returns for 1934 was 5.9 percent of the gross income of all manufacturing corporations. From these data we cannot estimate precisely the effect deconsolidation would have on balance sheet data. If data for 1935 were available comparable to those in Table 10 for 1934, the percentage changes due to deconsolidation and reclassification would be slightly larger than those in Table 10, col. 12 (for total assets presumably -13 instead of -11.6 percent). For the entire 'manufacturing' group the difference is negligible.

To the extent that mergers occurred in 1933-34 between corporations that took advantage of the privilege of filing a consolidated return for 1933, the comparison of 1933 and 1934 data in *Statistics of Income for 1934* (Table 10) does not show as big a change as it would if all corporations had switched to filing deconsolidated returns. However, no suitable data on mergers for manufacturing corporations between 1933 and 1934 seem to be available. Mergers and acquisitions in manufacturing and mining were fewer in 1934 than in any year 1929-33 (See Table 3).

¹⁸ Additional tax of .75 percent for 1932 and 1933, Revenue Act of 1932, Sec. 141 (c); 1 percent, National Industrial Recovery Act 1933, Sec. 217 (e).

Table 12
Consolidated Returns, Manufacturing Corporations,
1929-34, 1942, 1944

	1929	1930	1931	1932	1933	1934	1942	1944
Gross income reported on consolidated returns as % of total gross income reported on all returns	57.2	60.0	56.7	49.2	46.3	5.9	12.0 ^a	15.0 ^a
Assets of corporations filing consolidated returns as % of assets of all corporations ^b	n.a.	n.a.	n.a.	n.a.	56.0	n.a.	n.a.	n.a.
'Taxes paid . . .' reported on consolidated returns as % of 'Taxes paid . . .' reported on all returns	63.3	n.a.	n.a.	n.a.	54.2	n.a.	n.a.	n.a.

Statistics of Income.

n.a.: not available.

^a Total compiled receipts reported on consolidated returns as percentage of total compiled receipts reported on all returns. Gross income is smaller by the amount of wholly tax-exempt interest.

^b Submitting complete balance sheet data.

filed consolidated returns for 1933 were applied to 63.3 percent of the total balance sheet data for 1929.¹⁹

The following assumption, which apparently cannot be verified, must be made when applying the changes caused by deconsolidation in 1934 to the percentage of consolidated returns in 1929: as a whole, the corporations that filed consolidated returns in 1929 and that merged between 1929 and 1933 had a distribution of assets, affiliations with trade and mining subsidiaries, and financial intercorporate ties that paralleled the pattern of the entire group of corporations filing consolidated returns. If, for example, the corporations that filed consolidated returns for 1929 and that subsequently merged had larger subsidiaries engaged in mining than corporations that subsequently did not merge, the decrease in assets due to the fictitious deconsolidation and reclassification would be larger than appears from our computations.

¹⁹ No balance sheet data, but only income data of corporations submitting consolidated returns, are presented in *Statistics of Income for 1929*. A comparison of the percentage of "taxes paid . . ." by corporations filing consolidated returns (54.2) with the percentage of total assets owned by such corporations in 1933 (56.0), the only year when such a comparison is possible, shows that "taxes paid . . ." is a fairly adequate measure (see Table 12).

Mergers in 1934-39 also would have to be taken into account to make the comparison between 1929 and 1939 exact. The balance sheet data for 1939 would have to be deconsolidated to the extent of such mergers. While the data are insufficient for making such an adjustment, we may conclude that mergers in 1934-39 were not of such a magnitude as to affect appreciably the validity of our estimates.²⁰ The omission of the adjustment of 1939 data tends to be balanced, with respect to the final comparison of 1929 and 1939 data, by two errors in the other direction: (a) A slight underestimate of the effects of the fictitious deconsolidation in 1929. We assumed that the ratio of assets owned by corporations filing consolidated returns in 1929 to all corporations equals the ratio of "taxes paid . . ." by them to "taxes paid . . ." by all corporations. (b) An underestimate of the effects of deconsolidation in 1934 on two counts: fiscal year companies still took advantage of the privilege of filing consolidated returns in 1934, and any mergers that may have occurred between 1933 and 1934 had to be neglected.

Summarizing the effects of this fictitious deconsolidation and reclassification of the 1929 data it can be said that net worth, total assets, and all other balance sheet items except receivables and payables became smaller in the process. The two exceptions became substantially larger (14.7 and 22.8 percent). The decreases were especially marked for cash, tax exempt investments, bonds and mortgages, and 'other liabilities'.²¹

²⁰ Mergers and acquisitions in manufacturing and mining (excluding mergers with subsidiaries) during 1934-39 were fewer than half those during 1930-33. Similarly, the increases in investments (without mergers) in subsidiaries and affiliates of a sample of manufacturing corporations in 1934-39 were about half of the corresponding figure for 1930-33, as shown in Table 3. Little change in the relations between manufacturing corporations and their subsidiaries also seems to follow from the compiled balance sheet data of 892 registrants with the SEC 1935-39. The percentage of the net worth of the registrants that was invested in nonconsolidated affiliates was almost the same in 1935 and 1939 (4.2 and 4 percent respectively). See *Statistics of American Listed Corporations*, Part 2, Tables 5 and 6.

²¹ Compare W. L. Crum, *Corporate Size and Earning Power* (Harvard University Press, 1939), pp. 359 ff. The decrease in inventories is slightly larger, of course, when 1929 data are deconsolidated than the discrepancy between the two amounts for inventories in 1934, presented by W. D. Hance, *Survey of Current*

From 1935 to 1941 manufacturing corporations and the corporations closely affiliated with them were not permitted to file a single consolidated return (unless they were fully consolidated), while certain types of corporation did enjoy this privilege.²² The privilege was extended to all affiliated corporations for taxable years beginning after December 31, 1941, under certain conditions regarding their connection through stock ownership with a common parent corporation.

Thus the balance sheet data in *Statistics of Income for 1944* are in part based on consolidated balance sheets. Consolidated returns played a smaller role in 1944 than in 1929, chiefly because of the higher tax rate.²³ Total compiled receipts reported on consolidated returns amounted to only 15 percent of total compiled receipts reported on all returns of manufacturing corporations (Table 12).

Apparently no data are available that would permit an accurate estimate of the nonconsolidated balance sheet data of the manufacturing corporations that submitted consolidated returns for 1944. On the assumption that the effects of consolidation, as far as trends go, were similar to those in 1933, the estimates for 1933 were applied to 15 percent of the data for 1944.²⁴ They probably should have been applied to a somewhat larger percentage, for the importance of consolidated returns is presumably somewhat underestimated by taking

Business, Sept. 1942, p. 18. Similarly, the decrease in capital assets is larger when 1929 data are deconsolidated than when 1934 figures are adjusted (Fabricant, *Capital Consumption and Adjustment*, Table 54, p. 247).

²² Railroads, including electric railways after 1935, trackless trolley and bus systems after 1937, and—beginning with 1940—Pan-American trade corporations (*Statistics of Income for 1940*, Part 2, pp. 13, 37).

²³ For 1932-33 the income tax to be paid by corporations submitting consolidated returns was 0.75 percent higher than otherwise. For 1944 the surtax for consolidated returns was 2 percent higher than for nonconsolidated returns.

²⁴ The compiled balance sheet data for 1943 of 1,087 registrants with the SEC classified as 'manufacturing' represent percentages of the thus adjusted compiled balance sheet of all corporations which are similar to the corresponding percentages for 1939. Receivables, for example, of the SEC corporations amounted to 41 percent of the receivables of all corporations at the end of 1943, before deconsolidation. After deconsolidation, the percentage is 39, as compared with 36 for 1939 (see Tables 1 and 13).

total compiled receipts as a measure (see Table 12). The changes due to fictitious deconsolidation and reclassification were less than a billion, except for net assets and total assets.

Table 13
Compiled Balance Sheet of Registrants with the SEC Classified
as 'Manufacturing', 1939 and 1943
(millions of current dollars)

	1939	1943
Number of registrants	1,030	1,087
Cash & cash items	3,520	6,538
Marketable securities	955	4,167 ^a
Trade receivables, net ^b	2,704	6,248
Inventories, net ^b	6,409	10,648
Investments in affiliates, net ^b	1,045	1,098
Other investments, net ^b	1,338	1,276
Land, buildings, & equipment, net ^b	15,672	16,526 ^c
Treasury stock	65	8
Intangibles, net ^b	692	627
Deferred charges	359	437
Other assets, net ^b	592	2,976
Total assets	33,352	50,548
Notes payable	346	1,123
Accounts payable	1,120	3,341
Accrued items	1,190	7,498 ^d
Long term debt, instalments due in 1 year	43	30
Total long term debt less instalments due in 1 year	3,410	3,612
Other liabilities	573	2,345
Other reserves	1,026	2,620
Minority interest ^e	362	329
Total liabilities	8,070	20,898
Total stock	15,838	16,057
Total surplus ^f	9,444	13,594
Total liabilities & net worth	33,352	50,548

SEC, *Survey of American Listed Corporations, Balance Sheet Data, 1939-1943*, Part II, pp. 2-3.

^a Including nearly one billion for United States tax notes.

^b After reserves, unless registrant carried valuation reserves as liabilities.

^c Including Emergency Plant Facilities, at least half a billion dollars (full amount not stated).

^d After deduction of United States tax notes for tax provisions (\$1.8 billion).

^e Refers to the amount of capital stock and surplus applicable to interests other than the corporate entity.

^f Including surplus reserves.

4 Noncorporate Enterprises

Assets owned by manufacturing corporations were raised to include those of other manufacturing enterprises. The value of product of all enterprises divided by the value of product of

enterprises owned by corporations gives the ratio used as apparently the best for this purpose.²⁵

Another ratio that could have been used, viz., that yielded by dividing the value added by all enterprises by the value added by enterprises owned by corporations, would give a slightly higher result. However, even the former possibly overestimates somewhat the role of noncorporate enterprises.²⁶ The overestimate, if any, can be assumed to be about the same in 1929 and 1939, so that a comparison of 1929 data with 1939 data would not be affected by it.

As no Census data are available for 1944, the 1939 ratio was used to raise corporate balance sheet data for 1944 to include noncorporate enterprises.

Differences in the scope of the *Census of Manufactures* for 1929 and 1939 need not be considered here, since the 1929 ratio we used was from the *Census of Manufactures, 1939*, where the changes between 1929 and 1939 had already been taken into account. The coverage of the *Census of Manufactures, 1939*, is practically identical with the 'manufacturing' group in *Statistics of Income for 1939*.

5 Deduction of Data for Alaska and Hawaii

To get data for the continental United States alone, the percentage produced by establishments in Alaska and Hawaii in 1939, 0.3, was deducted from the total value of product of manufacturing enterprises in the continental United States plus Alaska and Hawaii.²⁷ The *Census of Manufactures, 1929*

²⁵ The same method was used by E. A. Keller, *A Study of the Physical Assets, Sometimes Called Wealth, of the United States, 1922-1933* (Notre Dame University, 1939), p. 91.

²⁶ The ratio of gross annual sales, in 1939 for example, of manufacturing corporations to capital assets increases inversely to the size of corporation. Noncorporate enterprises are usually smaller than corporate. Value of product figures differ from gross sales figures, however, mainly in that they include commodities transferred to other plants of the same enterprise. As interplant transfers are probably a larger item for corporations than for other enterprises, the overestimate that would arise from a gross sales ratio tends to be offset.

²⁷ *Census of Manufactures, 1939*, I, 19, Table I. Data on inventories at the end of 1939 are available for Hawaii (*ibid.*, III, 1137) but not for Alaska.

does not give data for the territories, and no data for 1944 are available. Consequently, the same percentage was deducted from the amounts for 1929 and 1944.

Of the 1,059 registrants classified by the SEC as manufacturing and on which 1937 data are presented in *Statistics of American Listed Corporations*, Part 1, four were incorporated in Canada, one in Hawaii.

6 Computation of the Estimates for 1946

Estimates of assets and liabilities of all manufacturing enterprises at the end of 1946 are usually based on data for the end of 1944 after adjustment for changes during 1945 and 1946. These estimates were compared with the estimates for corporations alone, by the Federal Trade Commission and the Securities and Exchange Commission for the end of the first quarter of 1947.²⁸ The FTC estimates are not strictly comparable with our series. First, they are based on highly consolidated reports, as can be seen from the following figures. Marketable securities, other than United States government securities, were estimated to be \$679 million; miscellaneous assets (including investments in nonconsolidated subsidiaries and affiliates) \$7 billion. On the basis of Statistics of Income, however, miscellaneous assets of manufacturing corporations (not including investments in subsidiaries) may be estimated to have been about \$3.6 billion, and investments other than in government securities about \$11 billion at the end of 1946. Secondly, the FTC estimates understate slightly the true aggregates, because neither corporations that had changed from nonmanufacturing to manufacturing activities nor all corporations organized since the end of 1943 were included.²⁹ This understatement generally tends to be balanced by the presumable overstatement due to the consolidated character of most reports.

Cash and deposits in banks of all manufacturing enterprises were estimated in the following manner. According to the

²⁸ *Quarterly Industrial Financial Report Series for All United States Manufacturing Corporations, First Quarter—1947*, p. 4, Table 2.

²⁹ *Ibid.*, p. 13.

Federal Reserve Bulletin (Oct. 1947, p. 1310) demand deposits held by manufacturing and mining corporations and partnerships amounted to \$16.4 billion at the end of July 1946 and \$16.0 billion on February 26, 1947. Cash and bank deposits held by manufacturing enterprises alone were estimated by considering the following facts. According to tabulations prepared by the Commissioner of Internal Revenue, cash and bank deposits held by mining corporations accounted for 4.2 percent of the total amount held by manufacturing and mining corporations at the end of 1944.³⁰ Currency and time deposits were 8.1 percent of demand deposits owned by nonfinancial corporations at the end of 1946.³¹ Reducing this figure by the percentage by which the comparable estimate for the end of 1944 is larger than the figure computed from *Statistics of Income* brings the amount for cash and bank deposits estimated to be held by all manufacturing enterprises at the end of 1946 (\$11.7 billion) somewhat closer to the FTC estimate for corporations (\$10.2 billion at the end of first quarter of 1947). The discrepancy between the two estimates is due to the large amounts of cash and bank deposits owned by unincorporated enterprises (see App. B); the decrease in cash and bank deposits owned by corporations in the first quarter of 1947; ³² the relatively large holdings of cash and bank deposits by small enterprises, combined with the reliance of the FTC estimates on data for large corporations chiefly.³³

Notes and accounts receivable were computed as an average of two estimates. In the first estimate, this item was assumed to have decreased 15 percent since 1944, on the basis of the decrease in corporate sales 1944-46.³⁴

³⁰ Treasury Department, Press Service S-484, Oct. 8, 1947, Table 3.

³¹ *Federal Reserve Bulletin*, Sept. 1947, p. 1104.

³² Nearly one billion for all corporations excluding banks and insurance companies; SEC, Statistical Series Release 779 (July 25, 1947) and 784 (Nov. 20, 1947).

³³ The sample for small corporations was rather small (one out of 72 for corporations with total assets of less than \$50,000); *Quarterly Industrial Financial Report Series For All United States Manufacturing Corporations, First Quarter—1947*, p. 10.

³⁴ *Survey of Current Business*, July 1947, Supplement, p. 41, Table 29.

In the second estimate, 30 percent was deducted from the amount for 1944, in accordance with the large decrease in receivables of 812 manufacturing corporations registered with the SEC (Table 8), caused by payments due from the federal government. 'Receivables from U.S. Government' was a less important item for smaller corporations.

The FTC estimates of receivables are considerably smaller (\$11.6 billion). The difference is not quite as large as it would be had receivables not increased during the first quarter of 1947.³⁵

Inventories were computed, as shown in Table 14, by adding to Hance's estimates for 1941 the annual increments in 1942-46.³⁶

Table 14
Manufacturers' Inventories, End of Year, 1929 and 1939-46
(millions of current dollars)

	1929	1939	1940	1941	1942	1943	1944	1945	1946
Corporate	12,720	11,129	12,427	16,421	n.a.	n.a.	n.a.	n.a.	n.a.
Noncorporate	875	685	734	961	n.a.	n.a.	n.a.	n.a.	n.a.
Total	13,595	11,814	12,861	17,382	19,681	20,356	19,323	18,555	22,850

W. D. Hance, 'Estimates of Annual Business Inventories, 1928-1941', *Survey of Current Business*, Sept. 1942, p. 18, Table 1 (1929-41); 1942-46 computed from *Survey of Current Business*, July 1947, Supplement, p. 45, Table 33. Hance's figures are before adjustment for changes in industrial classification and for changes due to the discontinuation of the privilege of filing consolidated returns in 1934.
n.a.: not available.

Investments, government obligations, were first based on the 28 percent decrease in holdings by nonfinancial corporations.³⁷ In the second estimate, 37 percent was deducted from the amount for 1944, in line with the decrease for manufacturing corporations registered with the SEC (Table 8). The decrease, however, occurred chiefly in holdings of United States tax and savings notes, a trend presumably not fully shared by smaller enterprises. The average of the two estimates approximately squares with the FTC estimate (\$6.6 billion) in view

³⁵ For all corporations excluding banks and insurance companies, \$1.6 billion, SEC, Statistical Series Release 784 (Nov. 20, 1947).

³⁶ Our estimate is \$0.6 billion smaller than the estimate published by the Bureau of Foreign and Domestic Commerce after this paper had been completed: *Industry Survey, Manufacturers' Sales and Inventories—Revised Series* (Feb.-March 1948).

³⁷ *Federal Reserve Bulletin*, Sept., 1947, p. 1104.

of the decrease in holdings of United States government securities in the first quarter of 1947.

Other investments, which cannot be checked with the FTC estimates, were assumed to have remained unchanged since 1944.³⁸

Capital assets, net, were estimated on the basis of expenditures for new manufacturing plant and equipment amounting to \$9 billion (current) in 1945-46, as shown in Table 4, and expenditures of \$1 billion for used plant and equipment,³⁹ minus depreciation of approximately \$7.5 billion.⁴⁰

Other assets were assumed unchanged since 1944.

Accounts payable were estimated—similarly to receivables (first estimate)—on the basis of the decrease in corporate sales, 1944-46. The FTC estimates are appreciably lower (\$6.8 billion) because most of the underlying data are based on consolidated reports.

Bonds, notes, mortgages payable were estimated by adding to the FTC estimate 7.9 percent for noncorporate enterprises.

Other liabilities were computed as a residual. The decrease since the end of 1944 in accrued taxes and renegotiation provisions of 812 registered corporations was \$3.7 billion (Table 8). The decrease in other miscellaneous liabilities, plus the drop in other liabilities of other enterprises, may have amounted to about \$3 billion. An estimated total decrease of \$6.7 billion for this item squares with its computation as a residual.

Net worth was estimated by adding to the amount at the end of 1944 the undistributed income of manufacturing enterprises in 1945 and 1946, estimated to be about \$6.1 billion.⁴¹

³⁸ 'Other marketable securities' held by 812 corporations registered with the SEC fell about 22 percent (Table 8).

³⁹ *Survey of Current Business*, Jan. 1946, p. 18; *ibid.* July 1947, p. 12, Table 5.

⁴⁰ Depreciation, depletion, and amortization (amortization according to Section 124 of the Internal Revenue Code) by all corporations in 1944 amounted to \$3 billion (Treasury Department, Press Service S-484, Table 3). Depreciation, depletion, and amortization by more than 1,100 corporations registered with the SEC amounted to \$2.1 billion in 1944 and \$2.7 billion in 1945 (SEC, *Survey of American Listed Corporations, Data on Profits and Operations*, Part V).

⁴¹ Undistributed corporate manufacturing income was \$1,981 million in 1945 and \$3,718 million in 1946 (*Survey of Current Business*, July 1948, p. 21).

Tangible Assets
of
Public Utilities

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A REGULATION AND PUBLIC UTILITY VALUE

A unique economic characteristic of public utilities is the regulation of their operations, pricing policies, revenues, and income by governmental agencies. Since this institutional element of regulation is the core of the thesis to be developed in this paper, utility regulation is described briefly and some terms are defined.

By and large, utilities provide essential services. By and large, they are a heavily capitalized group of industries, as evidenced by the high ratio of plant to revenue, ranging from 3-1 to 7-1; for ordinary industrial and commercial concerns the ratios are well below 1-1. Most if not all utilities are industries of decreasing unit cost within wide ranges of capacity. With certain exceptions utilities sell services rather than tangible commodities; hence production for inventory to meet peak loads is precluded. As the services rendered are deemed necessary, utilities are normally required to serve all on demand.

Competition in the utility industries is both wasteful and ineffective in setting stable prices because the resultant duplication of relatively large amounts of plant and the consequent inability to take advantage of decreasing unit costs have led alternately to 'price wars' and to excessively high prices. This violent fluctuation of utility prices, together with the general inability to store the service, made it very difficult for enterprises whose cost of utilities services was a significant portion of the total cost of production to price their products intelligently and for any long period in advance. Consequently, it was found socially desirable to fix utility rates, i.e., prices, by governmental authority.

In time, the regulatory formula developed into what has come to be known as the 'fair return on fair value' rule.¹ That

¹ The argument that 'fair value' has in many cases been supplanted by 'original cost' is trivial for our purpose, since this paper considers 'original cost' as one possible definition of 'fair value'. Whether it should be the sole definition is another matter.

rule, very briefly, is this: a utility may charge such prices as will in the aggregate return to it all reasonable operating expenses, including taxes and depreciation, and in addition a 'fair return on the fair value' of its property used in rendering the service. Thus 'fair return' is synonymous in general with income, or the return on capital. We shall come to the meanings and implications of 'fair return', and of course 'fair value', presently.

Since gross revenues should reflect only reasonable costs of operation, commissions have exercised supervision over operating expenses.² Once reasonable operating costs are determined, the next step is to determine the 'fair return on fair value'. The sum of reasonable operating costs and the 'fair return' is the gross revenue the utility is entitled to earn.

Since utilities do not as a rule sell homogeneous products, this gross revenue could be obtained by various combinations of price or rate schedules.³ The next regulatory step is to devise a series of rate schedules it is *expected* will bring in a gross revenue equal to operating cost plus a fair return. Usually there is no provision for an extra assessment against customers if the rates do not bring in that revenue, or for a refund to customers if the rates bring in more.

Commissions usually have other powers and duties, chiefly to regulate proposed security issues, supervise the adequacy of service, and to decide when new firms may enter the area. Regulatory commissions, both state and federal, control accounting practices, spelling out in uniform systems the theory and procedures for keeping all corporate accounts.

Not all states have regulatory commissions, and not all commissions regulate all industries that are recognized as utilities. Some commissions have no jurisdiction over municipally-owned utilities, and some have no control over cooperatives.

² Usually a utility is not prohibited from incurring whatever expenses it cares to; however, the excess of such actual expenses over those found to be reasonable is not reflected in determining the gross revenues to be collected from customers.

³ A rate schedule is a supply price formula, quantity being the usual and often the only independent variable.

But by and large, and for the more important utilities, control is exercised throughout the country: intrastate operations are regulated by state commissions, interstate operations by federal commissions.⁴

B THESIS

At the close of 'On the Measurement of National Wealth', Mr. Kuznets stated that one purpose of his paper was to discourage attempts at global estimates of national wealth and to suggest studies of separate groups of wealth instruments and claims. He continued:

"The purposes of such studies would be to establish more adequately the significant classifications within the complex of wealth instruments or claims; to explore the various difficulties that would arise in the evaluation of the different groups, *and to point a way to measurement of national wealth that would be directed from the beginning at the significant classifications in the field.*" (italics mine)

I should like, for purposes of this paper, to adopt this quotation as a text; it is peculiarly applicable to public utilities.

In attempting to explore the problems that arise in connection with evaluating public utilities, the institutional aspect of public utility regulation must always be remembered. Prices of public utilities are set not in the market, but by means of a quasi-judicial, quasi-legislative organ—the utility regulatory commission.

The proposition I wish to explore is that this institutional factor of regulation has established the legal-regulatory concept of 'fair value' as the most significant element in determining the economic value of public utility assets.

To the extent that utility income is based on utility 'fair value', and in accordance with the definition that wealth re-

⁴ The scope of state utility regulatory powers is well outlined in Moody's *Public Utility Manual*, 1948, pp. a59-62. The jurisdiction of the Federal Communications Commission, the Federal Power Commission, the Interstate Commerce Commission, the Maritime Commission, and the Civil Aeronautics Board are generally similar but on an interstate basis.

flects income-producing capacity, utility economic value is a function of utility 'fair value'. In other words, the adoption of a unique regulatory definition of value, i.e., 'fair value', and the effective use of 'fair value' as a tool in determining utility income, have created the situation where, in principle at least, 'value' tends to be identical with 'fair value'. To the extent that actual income is different from the prescribed regulatory income, value will differ from 'fair value'. In any event, utility value will approach or tend to equal 'fair value', and approach it more closely as regulation becomes more continuous and effective.

For purposes of this paper it seems unnecessary to consider what economic definition of fair value regulation *should* adopt. That is another subject. As long as there is an effective basis upon which income is or *tends* to be determined, and as long as we identify wealth with its power to yield income, we must accept, as a logical proposition, that this basis is just as effective in determining wealth.

The thesis I should like to explore then is essentially that utility value is or tends to be what utility commissions and the courts make it. I do not believe this is avoiding the problem. The problem as I see it is: Given the institutional factors that tend to determine utility income, what is public utility value?

The concept of public utility 'fair value' was developed after casting about among the various economic definitions and methods of determining value. The choice resulted from meeting and failing to solve many problems of methodology. The concepts (for there are more than one) finally adopted are a rough compromise between the economic and administrative elements involved; rough because into the choice went considerations other than those of economics and public administration.

However, only by giving full weight to this prime economic factor of 'utility prices and income by regulation' can we, in Mr. Kuznets' words, "point a way to measurement of national wealth that would be directed . . . at the *significant classifications in the field.*" (italics mine)

C FAIR RATE OF RETURN

Before plunging into the question of the valuation of public utility assets, it is well, for several reasons, to discuss briefly the regulatory concept of 'fair rate of return'. First, it is closely allied to the rate at which income can, in general, be capitalized to determine value; second, it gives useful information on how public utility value is *used* in determining utility income.⁵ It thus provides the link between wealth and income for the utility sector of the economy.

To set up some means of measuring 'fair return', early thought in regulation defined 'fair return' as the product of 'fair rate of return' and 'fair value'. The classic definition of what constitutes a 'fair rate of return' was given by Justice Butler:

"A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investment in other business undertakings which are attended by corresponding risks and uncertainties."⁶

Despite this link between 'fair rate of return' and 'uncertainty', for quite a few years the determination of 'fair rate of return' was a matter of 'expert testimony', supported by little else than 'experience in the field of finance' and a 'feel for the market'. While in many instances that approach is still used, more recently and especially since 1938, the concept of the 'cost of capital' has been developed to measure the 'fair rate of return'.

⁵ We should always know what questions we intend to answer before we begin collecting data. In other words, the first problem is not how to go about formally measuring wealth or value, but to decide what we intend to do with the results. In the field of public utilities value is used to determine income.

⁶ *Bluefield Water Works & Improvement Co. v. Public Service Commission of West Virginia*, 262 U.S. 678, 692, 43 Sup. Ct. 675.

Justice Butler apparently considered 'risk' and 'uncertainty' synonymous, as do many today who refer to 'business risk' as the element that gives rise to profits. The Knightian distinction between the two will be followed in this article.

Let us define 'capital structure' as the series of ratios of each type of capital, or capital component (i.e., bonds, stocks, preferred stock, etc.), to total capital. The cost rate of total capital may then be defined as the weighted average of the cost rates of the capital components, the weights being the capital structure ratios of the respective components. The cost rates of the individual components are expressed in terms of yields on bonds and 'adjusted' earnings-price ratios for equity, etc., the adjustments being made in order to reflect cost of financing, underpricing, etc.

Since the cost rates of the individual types of capital are in many cases functions of the capital structure,⁷ a relation between the cost rate of total capital (or cost of capital) and the capital structure can often be established. Minimizing that function with respect to the cost of capital, one can then determine what has been termed the 'optimum' or minimum cost capital structure and, from this capital structure, the cost rates of the individual capital components and the over-all cost of capital.⁸

When a company's own securities are traded on the market, some indication of the levels of the capitalization rates for the various types of capital can be obtained directly. In addition, or in lieu of such data, the behavior of the various capitalization rates, both as to level and as concerns the relationship to

⁷ For example, it seems evident that as the proportion of gross income required to cover fixed interest charges increases, the uncertainty of the equity investment will increase, and hence the cost rate of equity money as well.

⁸ A controversy is brewing over what cost of capital really means. One school holds that if a past or historical cost rate base is used, the contemporaneous past cost of capital must be used in finding the fair rate of return. It is contended further that a current cost of capital fair rate of return can be used only with a current cost rate base.

Opponents say the above is not correct; the requirement that a past cost rate base must go with a past cost of capital is a plea for semantic and not necessarily economic consistency. In view of the conclusions reached later in this paper, that capitalization of income is not a feasible method for evaluating utility assets, the attributes of a proper capitalization rate need not concern us further here. However, the sharp differences of opinion over what such a capitalization rate should be indicate the difficulties inherent in the capitalization of income approach to valuation.

the capital structure, may be determined from the market behavior of the securities of 'comparable' utilities.⁹

While this statistical approach to the cost of capital eliminates in large measure reliance on unfettered expert opinion, it must be used circumspectly and in the light of generally sound principles of finance.

'Fair rate of return', either because of more precise analysis or because of decreasing interest rates (probably for both reasons), has fallen from typical values of 7-8 percent in the middle 1920's to 5-6 percent.

D 'FAIR VALUE' AS A MEASURE OF PUBLIC UTILITY ASSETS

It may not be amiss at this point to emphasize a basic definition: wealth is significant because and to the extent that it yields income. In fact, 'things' become wealth only if they produce income. Income is not the result of wealth; the existence or expectation of income is a prerequisite to the existence of wealth. Consequently, the theoretically correct value must be determined in terms of expected income flow, discounted at a 'proper' capitalization rate.¹⁰ This then leads to the conclusion that the generally correct method of valuation is to capitalize expected income. Yet we know of at least three other widely used approaches to valuation, and it has been suggested that each can in certain cases be considered an approximation to the capitalization method; the reason for the substitution is the practical difficulty of the direct capitalization approach.¹¹

⁹ The determination of comparability may in some cases be rather difficult, the standards of comparability being at times a matter of subjective judgment. It is perhaps enough to say at this point that the 'battle' of utility rate regulation has shifted in large measure from the 'value' to the 'fair rate of return' front.

¹⁰ This concept is perfectly general and applicable to the economy as a whole, but requires refinement for certain sectors; otherwise a large portion of government-owned 'things' would be defined as free goods.

¹¹ I venture to suggest that the practical difficulty consists in large measure in the fact that the capitalization rate is as complex a problem, theoretically, as valuation, and a problem that has been lost sight of in the search for 'pure interest'.

In general the four chief methods of valuation are: capitalization of income, current market price, cost of reproduction, and original cost. We pay our respects to the forefather of the 'fair value' doctrine in public utility regulation, the case of *Smyth vs. Ames*:

"And in order to ascertain that value, the original cost of construction, the amount expended in permanent improvements, the amount and market value of its bonds and stock, the present as compared with the original cost of construction, the probable earning capacity of the property . . . are all matters for consideration. . . . We do not say that there may not be other matters to be regarded in estimating the value of the property . . ." (169 US 466,546).

Even without the catch-all at the end, Justice Harlan included the four measures of value, even noting the claims approach (to valuation). And in stating that these "are all matters for consideration" he let utility regulation loose in an economic labyrinth. The field of public utility valuation for regulatory purposes has been preempted by the cost of reproduction and original cost; at present the latter is leading.

I do not intend to discuss which of these four methods is 'best' for rate-regulatory purposes, regardless whether 'best' is defined in legal, economic, and/or administrative terms. Nevertheless, it seems desirable to consider to what extent each method is applicable to public utilities, and how these methods have been applied by regulatory bodies in determining 'fair value'. Even if we were to decide on principle to accept 'fair value' as an estimate of economic value, it is still desirable to know, in some detail, just what 'fair value' is and is not. Such knowledge may help to show how 'fair values' of public utilities can be fitted together with values of other groups of wealth instruments in computing over-all wealth estimates.

1 *Capitalization of Income*

If the desideratum is to ascertain whether a given utility income constitutes a 'fair return' on 'fair value', it is obviously improper to determine the latter by capitalizing the income

at the fair rate of return. Such a procedure involves circular reasoning, and would lead to the conclusion that *every* income is a fair return. For regulatory purposes therefore, capitalization of income provides no basis for valuation. However, this method may have use in 'discovering' value. Since it may have a purpose, it is worth while to discuss it as a general method.

One might well approach this method by considering the variables entering into the capitalization of income; expected incomes, specified as to distribution in time as well as to amounts, and the capitalization rate.

Several difficulties of determining those variables with any degree of accuracy are apparent. Since by the very nature of things the incomes are *expected* incomes, they must be estimated, i.e., they are forecasts. And since they are subjective estimates, is it justifiable to use such an elusive basis for valuation without inquiring why people think as they do, and what correction factors should be applied to those 'thoughts'? It has been suggested that the distribution of estimated incomes in future time is even more elusive.

The second variable entering into this method is the capitalization rate. Mr. Kuznets points out that if the determination of the future income distribution has been made in the light of all possible risks, the capitalization rate equals the pure interest rate. He qualifies this by saying that since at best such a forecast will not reflect all 'risks' but only the more obvious ones, a more realistic assumption is that the capitalization rate should reflect a risk element that would vary as between different categories of wealth. I agree in general; however, such a forecast could at best reflect only risks, not uncertainties. The capitalization rate must therefore, as a theoretical proposition and not merely as a practical or 'realistic' matter, be higher than 'pure interest', the differential varying as between categories of wealth. In fact, for many purposes these very categories might well be defined in terms of this uncertainty differential.

As concerns expected incomes, I venture to suggest that as a practical matter the 'future income distributions' actually used in determining offer and bid prices of securities, for example,

are very short run estimates. Moreover, they are corrected continuously in the market—by sales or decisions not to sell. The opportunity for this type of successive correction is facilitated by the fact that the assets themselves need not be sold—only the claims. While theoretically, value as ascertained by capitalized income comprehends *all* future income, the day to day values as evidenced by actual sales are not capitalizations of all future incomes—perhaps only next year's expected income. The market simply does not have all income data; at best it has only short run estimates of income, and they set prices.

If then only short run earnings are determinative, we need find only short run capitalization rates. To reflect reality, the problem can be telescoped in time from a long run, rather vague matter, very difficult to express quantitatively, into a short run problem which might lend itself to quantitative analysis. Dropping the requirement of long range estimates of the future income distribution and of a long term weighted capitalization rate makes it considerably easier, both theoretically and practically, to utilize capitalization of income as a valuation tool.

It has been suggested to me that capitalization of income is not only theoretically correct but also provides a practical and effective method of 'discovering' public utility value. The argument runs as follows: the income statements of utilities are more reliable than their balance sheets; reported income is the result of the application, faulty and imperfect as it may be, of the regulatory concept of value; even though regulation is imperfect and discontinuous, and hence reported income may exceed what might be deemed reasonable after a full rate case, the income was received and is a *fact*, and therefore becomes the subject of valuation; one should deal with actual income, and consider the results of regulatory valuation 'as is', not what might be if regulation were precise and continuous, or different from what it is; and since value depends upon income, utility value should be determined by capitalizing income.

This suggestion has merit and might be the basis for a sam-

pling approach to valuation. For example, assume that only Companies a, b, c, and d of Industry A have securities outstanding in the hands of the public and that the securities are actively traded. Expected earnings for Companies a, b, c, and d could be estimated and related to representative market prices of the corresponding claims, to yield an estimate of the industry-wide capitalization rate. This rate could then be applied to estimated earnings of Industry A to obtain its value. However, several qualifications are obvious. The above procedure could apply only to sectors of the economy where the speculative effect in setting the market price of securities is either negligible or can be corrected for; and to portions of the economy homogeneous enough to lend themselves to a sampling procedure.

While the capitalization of income approach to valuation offers some intriguing possibilities, close scrutiny reveals difficulties in both theory and practice. First, it is obvious that it is not current or reported income that can be capitalized to determine value, but rather future, expected income. We thus lose the alleged factual benchmark for our capitalization. Only if we first establish that actual income will persist can we capitalize it to determine value.

Second, the very suggestion of the use of the capitalization method is founded in large measure on the practical fact that regulation is neither continuous nor exact. Commissions estimate what a given set of prices will return in the way of income. If their estimate is correct, the income will be the 'fair return' on a previously determined 'fair value' and we would not need to capitalize income to discover this fair value. How can it be logically proposed that a method based on an estimate of future incomes be used to correct a situation arising from inability to estimate future incomes? That seems to come very close to circular reasoning.

Third, what of the capitalization rate to be used? Theoretically the capitalization rate reflects all the uncertainties inherent in the potential earnings situation of the enterprise. Presumably this capitalization rate would contain elements

reflecting the discontinuous character of regulation as well as the possible error in estimating the net income effect of a prescribed series of utility rates and charges. We seem to be faced again with the task of estimating a probability distribution with relation to future income—the very situation that gave rise to the suggestion of using the capitalization method of valuation.

The determination of an 'appropriate' capitalization rate raises problems. Obviously, an industry-wide capitalization rate would have to be some sort of weighted average. The uncertainty inherent in a small independent telephone company is quite different from that in say the New York Telephone Company. What weights would one use in computing the capitalization rate for the telephone industry in the United States? Conceptually, the capitalization rate reflects the uncertainty status of a given enterprise, and the problem of determining that rate for any given enterprise as of a specific time is fraught with so many difficulties, both theoretical and practical, as to make the extension of the concept and its statistical determination a highly uncertain procedure. It is one thing to say that an investment in the telephone business is more (or less) uncertain than an investment in the electric business; it is quite another to set up an objective, theoretically sound and practically feasible mechanism for determining the difference. The writer is unaware of any discussion (to say nothing of agreement) on the subject and has had little opportunity to give it much thought. Until the theoretical and practical details of an industry-wide capitalization rate have been worked out valuation by capitalizing income might well be held in abeyance on that score alone.

In general, assume that a regulatory body sets 'fair value', the 'fair rate of return', and prescribes a set of utility rates it is estimated will yield the 'fair return'. Then either because of an error in the estimate of what these utility rates would yield in the way of net income or because demand has changed, the actual return exceeded the fair return. Capitalizing the actual return at the 'fair rate of return' will yield a value higher than

the previously determined 'fair value'. On the general basis that 'value depends on income' it could presumably be said that the real value is in fact higher than the 'fair value'. This seems like ascribing value to imperfections in regulation. Perhaps proponents of the capitalization method would argue that it makes no difference how the income got to be larger than the fair return; the larger the income, the larger the value.

If it could be assumed that this larger income would persist, one could logically claim an increment in value. But that would be assuming nonexistent or completely ineffective regulation. A second, more reasonable and realistic, assumption would be that this 'extra' income would persist for a time, say until the next rate case. Then if it were possible to estimate how long the larger income would persist, one could still place a value on it. In the second case, value would fluctuate about 'fair value', and tend to approach it as regulation became more precise and continuous. In any event 'fair value' can be viewed as the limiting value of a tendency or long term trend. For purposes of national wealth estimates such a figure has merit.

Thus for a comprehensive determination of wealth it would seem that one must look to valuation methods other than the capitalization of income.

2 *Current Market Price*

Current market price and current reproduction cost are very much alike in principle. Both base their claim to being indicators of value on the proposition that when people buy or assemble wealth they do so in order to obtain income.

Of course utilities are not bought and sold on the market. In fact, even the claims to the tangible and intangible assets that are traded represent only small fractions of the total outstanding claims. In view of the infrequent (and for utilities practically nonexistent) sale of utilities as such on the market, there is no need to more than mention the theoretical objections to the 'current market price' approach to valuation on an asset basis; elaborate discussions are readily found:

- 1) Difficulty of defining 'current market price' as at a given time—market prices presupposing a continuous market;
- 2) Small volume of transactions. Here a distinction should be made between the asset and claim approaches, primarily due to speculative factors that find easier play in the latter case.

It was the nonexistence of a free competitive market for utility properties that eliminated this measure of value in evaluating utilities for regulatory purposes. Commissions soon found that such transactions simply did not exist. However, the market price method has some validity in connection with the claims approach; of that more later.

3 *Current Cost of Reproduction*

In the early days of regulation current reproduction cost of utilities was determined by making a detailed inventory of all plant and property, and valuing it at prices as of a given date. Not only was the plant priced as of that date; it was assumed to have been built on that date—with the result that all sorts of intangibles, hypothetical consulting fees, the tearing up of streets that had not been torn up, etc. went into the reproduction cost of plant. Nonreproducible assets (primarily land) were valued at estimated market prices, i.e., at current market prices of comparable assets. For example, land was valued on the basis of recent transactions in near-by, similarly situated parcels. In the case of gas-producing properties, where the 'land' is not comparable except with other 'utility producing' land, such a procedure amounts to capitalizing earnings to determine value to determine earnings; obviously circular reasoning. In these cases original cost was used as the next best measure. Since utilities were being valued as going concerns, a 'going concern value' was included in the cost of reproduction. This 'going concern value' was measured in several ways. In some instances it was found by capitalizing the difference between the earnings in the early years of the utility's life and what were considered 'reasonable' earnings. In other instances it was ascertained by the theoretical cost of training an operat-

ing force and developing a market. This 'intangible' was abandoned rather early. In any event, I leave this item to those who will discuss the valuation of intangibles.

The next step in the cost of reproduction procedure was to estimate accrued capital consumption or, as it is termed in utility parlance, accrued depreciation. This accrued depreciation was determined by 'field inspection'. 'Experts' inspected the property and determined its 'percent condition', the complement of its accrued depreciation. They drilled test holes in telephone poles, seriously inspected the corrosion in cast-iron pipes, and ran a judicious eye over buildings and other plant. For each piece of property they decided its 'percent condition'. For example, a pole deemed 10 percent depreciated was assigned a 90 percent condition. The weighted percent condition was applied to the reproduction cost of the plant; to that was added working capital and going concern value; the sum was called 'fair value'.

While practically this method of ascertaining accrued capital consumption was subject to many peculiar interpretations, theoretically at least it had the possibility of providing a reasonable estimate.

In time this 'inventory and inspection' method of determining current cost of reproduction changed over to a procedure of adjusting original, or book costs, by means of price indexes.¹² The accuracy and acceptability of the results depended of course on the validity of the indexes used. A rather indiscriminate use of indexes in 1933 led to an apparent rejection of this method by the United States Supreme Court, and the method fell into disrepute.¹³ Recently it has been revived and is being

¹² The ICC made the most comprehensive industry-wide valuation of all railroads in the country. It began as a split inventory method: roads were valued at cost of reproduction in 1914 prices for all plant in existence in 1914, plus all additions since 1914 at cost. The ICC has since adjusted this valuation by means of indexes to a cost of reproduction as of January 1, 1940, and in later cases further adjusted that. Depreciation was on both a book and inspection basis. For rate making purposes the ICC has used a compromise value between original and reproduction cost.

¹³ *West v. Chesapeake & Potomac Telephone Co.*, 295 US 662 (1935). Actually the Court rejected the inept use of indexes.

used with much greater skill, primarily by the telephone industry.

However, this recent use of indexes to adjust original cost has been accompanied by a crude and theoretically erroneous method of determining accrued capital consumption. The ratio of current reproduction cost to original cost is applied to the original cost depreciation reserve, and the product is assumed to be a proper capital consumption deduction from current reproduction cost.¹⁴ This is an inappropriate method of deflating an original cost depreciation reserve in order to determine a reserve applicable to the cost of reproduction. While the original cost is multiplied by the deflating index to get the cost of reproduction, the annual accruals must in addition be weighted by the number of years between the date of installation and of valuation. So much for the actual procedures used in the past to establish regulatory value by determining cost of reproduction.

Do the general conditions under which cost of reproduction reflects economic value exist in the case of public utilities? It seems clear that theoretically, cost of reproduction approaches value only under conditions of competition and where access to the field is open to any newcomer. In the case of public utilities neither condition applies. First, instead of the classical condition of competition, i.e., a large number of producers each of whom considers price as given, uninfluenced by his own actions, we have exactly the reverse situation. Secondly, access to the field is so restricted that competition is practically nonexistent. In the few instances where it does exist, regulation tends to eliminate it.¹⁵ Hence, expected marginal returns determine whether an existing plant shall be 'reproduced', i.e., replaced. An existing utility will not install a new, lower

¹⁴ This is the reverse of the equally erroneous procedure applied by the ICC in 1938 in Ex. Parte No. 115, where the ratio of cost of reproduction minus depreciation to cost of reproduction new was applied to original cost to reflect accrued depreciation on an original cost basis.

¹⁵ The merger of Western Union and Postal Telegraph in the national telegraph field, and the combination of the Keystone and Bell Telephone Companies in Philadelphia are two recent examples.

'cost of production' plant unless the total return on the new plant exceeds the annual costs of the new plant plus the amortization of the old plant.¹⁶

Mr. Kuznets points out also a condition under which cost of reproduction has an upward bias: when additions to assets can be made more readily than withdrawals, especially if total demand remains constant. This situation is specially true of public utilities. Utility assets are, on the whole, long-lived; hence depreciation charges, usually the sole means of withdrawing utility capital, are a very slow means of such withdrawal. In most instances, increases in utility plant must be substantial.¹⁷ Also in view of the regulatory requirement of serving all upon demand, additions must be made promptly. On the other hand, withdrawals of any substantial amounts of utility plant are permitted rather rarely.¹⁸ The conditions for an upward bias when the cost of reproduction is used as a measure of value seem specially present in the utility sector of the economy.¹⁹

Another theoretical difficulty with the use of current cost of reproduction as an estimate of value arises in connection with the determination and measurement of accrued capital consumption, discussed briefly in Section 5.

¹⁶ In view of regulation, the problem arises whether in the interest of stimulating the use of the most economical plant the utility should be allowed to include such amortization in operating expense or whether the advent of a more economical plant constitutes the maturation of an uncertainty, and as such has been 'paid' for, in a past rate of return in excess of pure interest.

¹⁷ This is not true for all types of assets for all utilities; e.g., a bus company can add one bus, a railroad one locomotive. On the other hand, because of the relative economy of large units, the addition of a generator by an electric utility may mean an investment of \$5,000,000.

¹⁸ Witness Western Union's difficulty in obtaining permission to curtail service in certain communities.

¹⁹ With at least three possible qualifications: Total demand is not constant for all utilities; while some are growing, some are static, others even declining. Moreover, some industries such as bus and air transport, and to a degree rail transportation, can contract capital readily because certain separable units are short-lived. The third possible qualification hinges on the definition of capital consumption. If a decrease in demand and certain regulatory requirements can be deemed to lead to consumption of capital, the upward bias may be minimized.

4 *Original Cost*

Historically, and because the other two methods were inapplicable, reproduction and original cost soon preempted public utility regulatory valuation.

Since the advent of accounting control by regulatory commissions and the adherence to uniform systems of accounting (uniform at least for a given industry), original cost has taken on a specificity in principle that was entirely lacking in the cost of reproduction approach. As long as these systems of accounting are used, original cost is not only uniquely defined but has the administrative advantage of being readily ascertainable for a large proportion of utilities. For utility regulatory purposes it has the advantage of being a fact and not subject to adjustments based on opinion. Also, it avoids the time-consuming element of elaborate inventories. These advantages have made original cost attractive for regulatory purposes.

Theoretically, original cost has little to recommend it. It reflects past decisions, which for the normal run of economic activity are so much water over the dam. Moreover, since the original cost of assets as of a given time is the sum of the actual dollar cost of each, identical items can have different original costs. However, if it is desired to adjust original cost so as to obtain values for given years at current year prices, or to obtain a series of values at a given year's prices, original cost is a good starting point for adjustments by means of a deflating technique, using appropriate indexes.

As concerns utilities, capital consumption in connection with original or book cost is reflected in what is called a 'depreciation reserve'. To this reserve is credited an amount equal to the 'annual depreciation expense', presumably an estimate of annual capital consumption. Retirements are debited to this reserve, and corresponding credits are entered in the appropriate asset account, also at original cost. The depreciation reserve hence purports to be a measure of accrued capital consumption, not a reserve for replacements. This reserve can be deflated to reflect the effect of price changes; hence it can be

restated for a series of years at current prices, or at constant prices of any given year. Whether such adjustments yield a good estimate of capital consumption will be discussed presently.

Whatever its specific virtues, if any, original cost is often the sole basis upon which accounting data pertinent to valuation are available for most utility industries. It is also the basis upon which many business judgments are made.

But most significant from the viewpoint of *finding* utility wealth, original or book cost is the most important single factor upon which the majority of regulatory commissions determine regulatory value. A good many commissions treat, in principle and/or practice, original or book cost synonymously with regulatory value.

The writer is aware of many criticisms leveled at original cost not only as an appropriate regulatory measure of 'fair value' but also as a proper basis for estimating economic value for purposes of national wealth estimates. The objections in the former group may or may not be well taken; in any event they are outside the scope of this paper. A criticism falling in the latter category is worth discussing briefly. It has been said that a utility with an allowable income of say \$600,000 per year is obviously worth more than one with an income of \$500,000, even though they may have the same original cost, and a method that indicates equal values is faulty. But *why* would these two utilities have different allowable incomes? Presumably the uncertainty attached to each is different; and hence the capitalization rate would be different. Thus even the implied remedy, capitalization of income, might well show the same value for different incomes. If we assume identical companies, why should the allowable income be different? The hidden assumption in this objection is that the capitalization rate is the same, and as such begs the entire question.

5 *Measurement of Capital Consumption*

Our primary concern here is less with current or annual capital consumption than with establishing the accrued or total capi-

tal consumption that exists in the assets to be valued. The flow of capital consumption and the sum total of that flow as between two dates are, however, intimately related.

To narrow the discussion to the subject at hand, i.e., public utilities, and to consider the general aspects of the problem, a little background in the depreciation accounting procedure of utilities may be of interest. In the earlier days of utility accounting for capital consumption the basic approach was 'retirement accounting'. A retirement reserve was built up by charges to operating expense to a level thought sufficient to take care of (accounting-wise) the retirement of the largest volume of plant that would be retired at one time. Neither the reserve nor the charges were related, in theory or practice, to depreciation. The charges were arbitrary and solely within the discretion of management, the amount often being dictated by business conditions. When business was good, the charges were high; when business was poor, they were reduced or omitted.

The telephone industry was a notable exception. Quite early it adopted depreciation accounting on the straight line basis. The general trend to depreciation accounting, especially to a straight line basis, has been strong. Depreciation accounting presupposes annual charges, which presumably approximate the annual accrual of depreciation, to operating expense. This annual accrual may be on a straight line, an interest, a unit of output, or various other bases. The annual charges are credited to the depreciation reserve (a balance sheet account). Retirements constitute debits to the reserve.

As the scope and thoroughness of regulation increased, both the depreciation expense and the reserve became the subject of careful scrutiny. In time the reserve began to take on the character of a measure of the accrued depreciation or accrued capital consumption that was to be deducted from original cost to determine the net cost of plant. This change in the interpretation of the reserve was strongly objected to by certain utilities which claimed that a reserve equal say to 30 percent of book plant was consistent with a claim that the plant was in 95

percent condition, i.e., only 5 percent depreciated, because, through maintenance, the plant was kept in nearly perfect operating condition.

The gap between the reserve and accrued depreciation began to narrow about 1935. Today both commissions and utilities generally accept the depreciation reserve as a proper deduction from original cost in determining net original cost. While it is not the purpose here to consider the various formulas used by different utilities to determine depreciation expense and reserve, it may be well to recognize that most commissions now prescribe straight line depreciation, and a large proportion of utilities now keep their books on this basis. Table 1 shows the trend in this direction for the electric utility industry and also indicates the methods used. The Bell System Companies, which in the aggregate provide over 80 percent of the telephone service in the United States, have used straight line depreciation for many years. Other utility industries are in the process of changing over, and as a result, industry data reflect a combination of methods, making analysis difficult.

In any consideration of capital consumption, one must always keep in mind that it can be defined in various ways, depending upon the purpose of the estimates. Without going into all the ramifications, several variations are pertinent here.²⁰ A concept useful for ascertaining net income for an accounting period is not directly applicable for establishing the total change in capital over time or for measuring the total accumulated capital consumption to be deducted from the gross current cost of capital assets.

For example, the complete consumption of an automobile tire is a consumption of capital. However, if a tire is used up in less than the usual accounting period, one year, its cost may never appear in any capital account, but merely be handled via the operating expense, 'maintenance'. If it is desired to reflect in estimates of capital consumption such items as the consumption of a tire, we must obviously recast the usual busi-

²⁰ For an admirable discussion see *Capital Consumption and Adjustment* by Solomon Fabricant (NBER, 1938).

Table 1
Changing Character of Electric Utility Depreciation Accounting, 1937 and 1945

	STRAIGHT LINE		INTEREST		REVENUE		OTHER		TOTAL	
	1937	1945	1937	1945	1937	1945	1937	1945	1937	1945
1 Number of utilities	21	132	7	13	28	18	65	90	121	253
2 % distribution of line 1	17.4	52.2	5.8	5.1	23.2	7.1	53.6	35.6	100.0	100.0
3 Elec. plant (\$ mil.)	783.0	3,269.5	215.4	582.3	1,399.9	857.7	2,959.4	4,170.9	5,357.7	8,880.4
4 % distribution of line 3	14.6	36.8	4.0	6.6	26.1	9.7	55.3	46.9	100.0	100.0
5 Depreciation reserve (\$ mil.)	153.2	804.7	30.3	129.9	188.1	208.4	263.2	757.2	634.8	1,900.2
6 % distribution of line 5	24.1	42.3	4.8	6.8	29.6	11.0	41.5	39.9	100.0	100.0
7 Ratio of reserve to plant (%)	19.6	24.6	14.1	22.3	13.4	24.3	8.9	18.2	11.8	21.4

Included under straight line methods are utilities whose depreciation rates are based on the estimated average service life of individual units of property, of functional classes of property, or of total depreciable electric property.

Under interest methods the estimated average service life of the property is estimated as in straight line methods but the annual expense is fixed by sinking fund or compound interest formulas or modifications thereof.

Revenue methods include utilities whose charges to depreciation expense are based on percentages of electric revenues adjusted for the cost of purchased power, maintenance, or other variants.

Included under other methods are certain utilities which state that no definite rules or rates are used in determining depreciation and amortization charges. In such cases the amounts credited to the reserve in each year or from time to time after inspection of the property are such as will, in the judgment of management, be sufficient to provide for current retirements and to build up reserves against future requirements. A few utilities did not report their method of providing for depreciation. Two utilities use a 'stabilized reserve' method, the amounts appropriated for each year being such as are necessary to maintain reserves at an arbitrary percentage of plant. Four utilities use two or more methods.

ness accounting procedures, shifting substantial sums from 'maintenance and repairs' expense accounts to depreciation expenses. For purposes of ascertaining income it makes no difference whether the cost of the tire is charged to maintenance or to depreciation expense; in either event it is a deduction from gross revenue. But for purposes of fixing value it does make a difference whether one considers the tire as a fixed asset or not.

To avoid duplication and undue accounting refinement, regulatory commissions define the major items of plant as 'units of property'.²¹ The retirement of a 'unit of property' results in a credit to the plant account and a charge to the depreciation reserve. The replacement of a minor item, i.e., not a 'unit of property', is charged to operating expense and does not lead to any entries in either the fixed asset or depreciation reserve accounts. This is a pragmatic approach to accounting, the effect of which on estimates of capital consumption depends upon how major or significant are the 'units of property'.

The extent of maintenance has of course a profound effect upon the accruing depreciation of plant. However, if the estimates of future economic life, and hence the annual charges to depreciation expense and credits to depreciation reserve, are made in the light of an expected 'normal' maintenance, there seems to be no need to add depreciation and maintenance expense to obtain an estimate of annual capital consumption. Only when maintenance and repairs expense gets out of balance with the annual depreciation expense, especially if the depreciation expense is on an average basis (such as straight line depreciation), will there be either an under- or an overstatement of capital consumption. It is in recognition of this situation that depreciation is defined, for utility regulatory

²¹ In general a unit of property is one whose economic life exceeds one year, the conventional accounting period. To avoid burdensome accounting detail 'minor' items, i.e., minor in terms of their cost, are not classified as units of property. For example, a valve whose life may be several years would nevertheless not be considered a unit of property because of its low cost as compared with that of the over-all boiler assembly.

purposes, as the consumption of capital not restored by current maintenance.²²

The above should not be construed as suggesting that depreciation reserves on the books of all utilities can be presumed to be measures of accrued depreciation. Too many suffer from former sins of omission. However, as these reserves approach the standards set up by current uniform systems of accounting, they will not only reflect better estimates of accrued capital consumption for regulatory purposes, and hence for estimating value,²³ but also make available better estimates of capital consumption than are ordinarily available for any sector of the economy.

²² The New York Public Service Commission's definition of depreciation is typical:

"Depreciation, as applied to electric plant, means the net loss in service value not restored by current maintenance, incurred in connection with the consumption or prospective retirement of electric plant in the course of service from causes which are known to be in current operation and against which the utility is not protected by insurance. Among the causes to be given consideration are wear and tear, decay, action of the elements, inadequacy, obsolescence, changes in the art, changes in demand and requirements of public authorities."

I disagree in principle with certain parts of this definition, since it implies that the listed causes can be considered in fixing the annual depreciation expense. I agree, however, that on a *post hoc* basis, capital consumption may have resulted from each or any of those causes. By implication the definition neglects to distinguish between capital consumption on capital account and on income account. See my article, 'Uncertainty and the Provision for Depreciation in the Public Utility Industries', *Journal of Business*, University of Chicago, Oct. 1943, p. 209.

²³ At this point I must reiterate a basic premise: utility value tends to be what commissions make it.

I am aware of the argument that this premise may lead to the conclusion that two plants, one owned by a private company and used to produce electricity for its own use, and another a public utility, otherwise identical, would have different values, both gross and net. This is not only possible but logical. *Physically* the plants are identical; *economically* they are not. They are no more identical economically than a plant operating under monopoly conditions and the identical physical plant operating in a competitive situation; though the costs may be the same, the prices and incomes need not.

In fact I may go further—my premise would lead me to the conclusion that identical plants, subject to different commissions which adopt different depreciation rates, would have identical gross values but different net values. This too seems perfectly logical, and the inevitable result of the previously discussed institutional factor.

One qualification on this optimistic statement: A substantial number of utilities have turned to depreciation accounting relatively recently. Not all have adjusted their depreciation reserves to make up for past deficiencies. But the trend is toward restating such reserves so that they will eventually represent 'reserve requirements'. Until such time, the reported reserves must be used with caution, and are subject to these shortcomings. And while the theory of these adjustments is straightforward enough, the practice is a job far beyond the scope of this paper. However, despite the tendency of commissions to use original cost minus depreciation reserve as utility value for earnings and rate control, in a substantial area of utility regulation current cost of reproduction minus depreciation is used, or at least considered, in determining utility value.

Given a book or original cost depreciation reserve, and assuming it to be adequate for original cost valuation purposes, how should it be adjusted so that it may be used with an original cost adjusted to reflect cost at a given year's prices? Were the price level the sole variable to adjust for, the technique would not be difficult. Mr. Fabricant has already described and applied it in *Capital Consumption and Adjustment*.²⁴ The difficulty in applying this technique is statistical—it is hard to obtain enough representative data to develop the necessary indexes. One must design construction cost and other indexes—a problem that would be simplified by confining the method to utilities as a group, and possibly further, to individual industries within the group.²⁵ Since more

²⁴ See especially Chapter 10, Price Changes and Measures of Capital Consumption.

²⁵ It is undoubtedly simpler and much more accurate to devise an index for construction costs in the telephone industry than for all utilities, and that in turn better than an index for all business. By bringing the analysis down to that lower level a weighted average index of construction could be obtained, the weights reflecting the proportion of plant represented by each index, before weighting the weighted average index of construction by the estimated depreciation charge applicable to the plant constructed at the given prices. Also under these conditions the estimates of depreciation charge could be very much more precise. See *Capital Consumption and Adjustment*, p. 165.

comprehensive data are available for utilities, the task of adjusting original cost depreciation reserves to either current or a given year's prices is simplified. But, as Mr. Fabricant carefully points out, this elimination of the 'hetero-temporality' of original cost reserves does not correct for a change in kind or quality of the equipment. In other words, obsolescence due to advances in the arts and changes in demand (to mention two of the more important elements) cannot be corrected for statistically. Advances in the arts, probably the more important for most utilities, tend to make existing equipment relatively obsolete. Consequently, for utilities that typically have long-lived equipment and are subject to an improving technique, even the price level adjusted reserve becomes a poor measure of accrued capital consumption. It seems, at least tentatively, that a statistical approach to reproduction cost depreciation founders on the rock of obsolescence, as did the 'field inspection' approach.²⁶ Perhaps the problem could be solved by a combination of the two.

6 *Value of Utilities that Cannot Earn a Fair Return*

For the most part, the market for utility services is a growing one, and the character of demand such that except during severe depressions a 'fair return' can be earned at various price schedules. Relatively high prices will ordinarily restrict consumption, yet a 'fair return' can be earned for the corresponding low level of consumption. Lower prices will for certain sectors of the market lead to larger consumption; and a fair return can be earned at this higher level of use.²⁷

However, at times because of what may be termed industrial

²⁶ The latter suffered not from any theoretical disability but from the failure to use the cost of reproducing the most economical plant to provide the service as a basis for measuring the obsolescence in the theoretically reproduced *actual* plant.

²⁷ Utilities do not sell a homogeneous product. A kw. hr. of electric energy consumed in lighting households is an entirely different economic good than a physically identical kw. hr. consumed in factory lighting. Utility services are therefore sold not on a single price schedule, but on a series of schedules, each listing the unit price for successive blocks of consumption. Differential pricing is quite well advanced in certain utility industries.

obsolescence the market for a given type of service so degenerates that at no schedule of prices can the utility or the industry earn what may be deemed a fair rate of return.²⁸ In other words, the 'fair rate of return', when applied to regulatory 'fair value', results in an indicated 'fair return' that cannot be earned by the utility at any conceivable series of rate schedules.²⁹ When faced with this problem, commissions set prices on essentially a monopoly-pricing basis—the maximization of profits. Does this situation require that we revise our concept of 'fair return' as well as of 'fair value', the more significant concept for our present purpose?

It might well be argued that if earnings are the key to value, and if a certain property cannot earn, or its earning power is impaired because of waning demand, its value has been correspondingly impaired. The property has to all intents and purposes depreciated; its plant has become at least partly obsolete because it is no longer in line with the demand for its services.

The commonly accepted definitions of depreciation include changes in demand as a cause. It would therefore seem that the depreciation reserve should reflect this obsolescence. However, the fact that the utility cannot earn a fair return on net value (i.e., after the deduction of this reserve) proves that the reserve does not reflect obsolescence.³⁰ The problem is how to measure the effect of the 'matured uncertainty'. A possible answer would be to capitalize the maximized income at the fair rate of return.³¹

²⁸ The railroads seemed to be in that general situation prior to the war. The currently recurring applications for rate increases may be an indication that the disease is chronic. The telegraph industry too may be in this state.

²⁹ This is true despite the 'essentiality' of utility services, and because at certain prices substitute services would be utilized.

³⁰ It is theoretically impossible that the reserve could 'cover' such obsolescence. A long-term decline in demand seems to be a well-nigh perfect example of business 'uncertainty' (in the Knightian sense). In fact, it seems to be the prime business uncertainty. See my 'Uncertainty and the Provision for Depreciation in the Public Utility Industries'.

³¹ This does not involve circular reasoning, for here we are not determining the value upon which to base earnings. By definition the situation rules out this procedure; here earnings have been determined by factors other than regulation; we seek to discover the value implied by these earnings.

How does the cost of capital behave in such a situation? As the demand for the particular utility service declines below the economic capacity of the plant, and as a further decline is expected, the investment desirability of the securities of the utility (or utility industry if the decline is industry-wide) diminishes. Not only will the market price drop but the yield on the bonds and the earnings-price ratio of the stock will tend to go up, since present earnings will be discounted as indications of future earnings.⁸² The determination of a capitalization rate under these circumstances would be even more difficult than usual. However, theoretically and subject to this difficulty, there seem to be no serious objections to determining utility value by capitalizing earnings.

To the extent that original cost minus depreciation is used for general value determinations of such utilities, that cost clearly overstates utility value. The overstatement is inflated by the fact that when demand is declining, as a long-term matter, firms skimp on maintenance and, to give a semblance of financial wellbeing, tend to understate depreciation charges (where and to the degree they are within the discretion of the company). The depreciation reserve becomes an ever poorer estimate of accrued capital consumption, as does the income statement for purposes of ascertaining net income on any realistic basis.

7 *The Claims Approach to Valuation*

Securities have value for the same reason that tangible assets have value—each is a ‘source’ of income. To the extent that both the tangible assets and the claims against them are valued for essentially the same income, the value of the latter may serve as a check on that of the former. However, claims and tangible assets can rarely be matched exactly. In addition to such assets as plant, cash, and receivables, there are always such intangibles as ‘goodwill’ or ‘going concern value’.

⁸² Under these circumstances the usual measures of cost of capital will tend to overstate the true capitalization rate and hence understate the value as measured by capitalized earnings.

And this is essentially the basic difficulty with using the claims-value approach as an independent check on the value of tangible assets. Does the value of claims reflect only the value of tangible assets or of tangible assets plus intangibles such as monopoly status and value of managerial skill? These are sources of income and hence constitute wealth. The question is, then, does such wealth attach to the tangible assets or is it a separable and separate item of wealth? If we assert that we have two distinct classes of wealth, we must conclude that a given electric motor has one value when operated by a skillful mechanic but a lower value when operated by a clumsy one. This proves nothing, for we can come to an apparently even more paradoxical conclusion: that a given combination of operator and motor is more valuable, i.e., constitutes more wealth, when operated to make a marketable product than when operated to make a product that cannot be sold; we have income in the first case and none in the second. We can of course define the difference in earning capacity as 'going concern value' or 'goodwill'.

This type of analysis by definition quickly leads into metaphysics. The crux of the matter is that in valuing claims we value the entire enterprise as a going concern. An attempt to value any segment of the total assets by the claims approach involves one in an impossible allocation—between tangible and intangible assets.

The claims approach in general proceeds on the theory that wealth is a capitalization of expected income and, as in the case of tangible assets, we must take the indirect approach. Obviously the reproduction cost of claims is identical with market price. The field here narrows to book cost and current market price. However, using the book cost of claims as an independent check on public utility value as determined for the most part by the original or book cost of plant leads to an identity. Assets equal liabilities as a bookkeeping procedure—the books balance. The earned surplus accounts (within the limits of corporate solvency) expand and contract to keep the books in balance. And since earned surplus is a part of common stock

equity, the book value of claims is bound to equal the net book value of the assets.

What about the current market price of claims? Are market prices of traded claims an acceptable basis for valuing them? We may ignore to a large extent the speculative factor, since it is at a minimum in the case of public utility securities. By and large they are traded on an earnings basis; the very fact of regulation would tend to bring this about. But what prices are we to use?

Stock market prices fluctuate daily. It is doubtful that income expectations fluctuate as rapidly. And the capitalization rate is conceptually a stable factor, which has significance only as a trend, not as a 'spot' figure. One could not use a 'spot' earnings-price ratio as a measure of the capitalization rate for common stock. 'Spot' market prices are equally meaningless as a measure of value.

However, if we are to 'normalize', or average market prices of securities, we meet the difficulty we had with current market prices of tangible property—how to define 'current'. A representative period for averaging utility common stock may range from 3 to 7 years or more. As in the case of tangible assets, current prices are not on 'as of a given date' data; they are, as Mr. Kuznets says, "an aspect of flow". In addition, the claims approach would leave some serious gaps in the data, since a surprising number of utilities do not have securities on the market; the securities are owned by holding companies or other affiliates. Utilities owned by governmental agencies and cooperatives would be excluded also.

In the case of combination companies, the market prices of the securities reflect a complex aggregate of evaluations of the various components. The problem of allocation becomes especially difficult; the statistical procedure of a partial regression analysis to analyze the combination even for a single utility industry is a major undertaking, and when completed, is subject to serious doubt on theoretical economic grounds.

Overhanging the whole claims approach is the matter of consolidating outstanding claims to avoid duplication. In the

utility industries there is extensive inter-company security holding. There would be numerous duplications in a simple arithmetic total of all the securities of a given utility industry. To eliminate them, especially on a market price basis, would be a prodigious task. However, to the extent that such an arithmetic sum does not conceal details of capital structure, it is of some significance.

Of course the use of cost of capital as a measure of rate of return precludes the use of the market price of certain securities as a means of setting regulatory utility value. But under continuous and effective regulation, with a rate of return reflecting security market realities, the market price of claims would approach regulatory value.³³ Therefore to use the market price of claims to indicate utility value is theoretically possible. To the degree that regulation is neither continuous nor effective, the market price of claims may not only reflect utility value in the long run but also a capitalization of windfall earnings due to the lag in or lack of regulation. This, in conjunction with the practical difficulties outlined, makes this approach to utility value very unsatisfactory. The book cost of claims is even less satisfactory. We seem to be left with the substantive approach to the valuation of public utility tangible assets.

E ALLOCATION

Allocation has three general aspects:

Separating utility operations from multipurpose operations. One instance is that exemplified by the Tennessee Valley Authority, where the electric utility operations are carried on jointly with those of flood control, navigation, soil conservation, etc.

Separating the various types of utility from combination utility operations. Typical of this situation are the combination electric and gas companies, and the electric and steam companies.

³³ If the fair rate of return or the actually earned rate of return were higher or lower than the ordinary interest rate, adjusted for uncertainty, the market's capitalization would differ from regulatory value.

Allocating the value of claims among the various types of assets underlying them.

The first aspect is of special importance in view of the basic premise that wealth determination should proceed on the basis of significant classifications of the economy. In addition to the multipurpose government projects many private industrial concerns own and operate very large power plants primarily to supply energy for their own industrial operations but sell, as utilities, substantial amounts of power. About 18 percent of the country's total electric energy production capacity is owned and operated by such industrial concerns. While the energy they sell as utilities and their revenue therefrom could be calculated, any allocation of their total power production facilities to such utility operation would be confronted with all the theoretical and practical difficulties of cost analysis. The problem is academic for present purposes since such operations are not formally classified as public utilities. In principle we have a case of both joint and overhead costs.

Any analysis on a byproduct assumption, while possibly valid for certain pricing purposes, is obviously not valid for purposes of wealth estimates. In the case of government-owned multipurpose projects, where the kind and volume of plant is what it is because it was built in expectation and partly for the purpose of providing power, a byproduct analysis is of even less value. Here we have the additional complicating factor that one or more of the joint products are not sold on any market, and those that are sold are often priced on a basis somewhat different from the basis on which the same products are sold by nongovernmental units. Hence a capitalization of income approach is of little if any use.³⁴ Here too the problem is one of allocating costs among joint products. It is a very important problem, an acceptable solution of which is yet to be found. My guess is that the answer lies in a careful econometric analysis of cost functions.

³⁴ It is not proposed to discuss here either what is a capitalization rate for government operation of utility plant or the ramifications of the effect of the payment (or nonpayment) of taxes or other expenses.

A similar problem of allocation arises in the case of natural gas companies. In many instances the production, or better, extraction of natural gas is a joint operation with petroleum extraction. The problem of allocation here is just as involved as in the case of multipurpose hydro-installations. In any event, for present purposes this problem too is academic since the extraction of natural gas is formally classified with mining, not with public utilities.

The second phase of the problem, to segregate the various types of utility from combination utilities, raises all the preceding questions as well as certain problems of a different character. If we are concerned with utilities as a group, this allocation is unnecessary. If some classification is desired, it can be based on the major operation of the combination utility, 'majority' being defined possibly in terms of gross revenue.

Another difficulty arises, again from the institutional factor of regulation. Even a casual analysis will often show that while, for example, the electric portion of a business is doing well, the gas operations are not. Strictly applied, utility regulation would set electric rates at a level to support the value of the electric investment. However, no schedule of rates can, in many cases, earn a fair return on the gas portion of the investment, and theoretically the gas rates would have to be so low as to earn less than a fair return. If they were, the total return to the utility would be less than a fair return on the total value. In many instances, however, such a situation is resolved by raising the electric rates to a level higher than necessary for the electric operation alone, so as to bring a total return adequate to support the total investment. In such cases the total value is reflected in the depreciated original cost of the total plant (assuming an original cost approach). Under these conditions, any allocation on the basis of original cost of each type of plant is logically incorrect. It will overstate the gas plant by exactly the same amount as would occur if the gas plant were separate and still unable to earn a fair return. However, in view of the regulatory action, the total value of the two would be correct.

The third aspect of allocation, that applicable to claims, par-

takes of the nature of the first two. If one is concerned with transactor groups, the allocation of claims to nonutility operations is significant. If a narrower definition is desired, i.e., steam utility as opposed to electric utility, etc., more extensive allocations will have to be made. In theory, the allocation should proceed on an income basis. However, the segregation of income itself entails an allocation of expenses and plant. On net balance such a procedure is, or comes dangerously close to, circular reasoning.

In view of the conclusion that the claims approach is not a very useful tool for valuing public utility assets, this complex subject is not discussed further. In any event, the general problem of overhead costs, joint production, and allocation is complicated, and the writer knows of no adequate general solution.

F VALUE COMPARISONS

One purpose of wealth estimates is to compare wealth at different times, either for the economy as a whole or for selected sectors. Before going into this question it is pertinent to inquire whether public utility value measured according to the concept adopted in this paper can be added to the value of other sectors of the economy, however measured, to yield an aggregate as of a given time. I think the answer is 'yes'. In this connection Mr. Kuznets' comments are apropos:

"The demands of the economic analyses in which estimates of groups of wealth instruments are to be used should dictate the answer to the question not only of scope but also of valuation. For some problems the gross value of such instruments, at either original or reproduction cost, is more significant than the gross value adjusted for accumulated consumption. For other problems either original cost or reproduction cost is the valid method. For still others the current market price may be the only admissible basis of valuation. No general statement can be made except the need of considering the various problems in which the estimates are to be used in deciding the questions of valuation. *And it is quite possible that such consideration will call for application of different methods of valuation to different groups of wealth instruments, as the*

only condition of the comparability of the latter and of their additivity into a significant total." (my italics)³⁵

It is the validity of the method of valuation for the particular group of wealth instruments, not necessarily the 'sameness' of the method for all groups, that is essential. In view of the current state of utility regulation, original or book cost not only is the most important single direct element considered by commissions in determining regulatory value, but also serves as the base for adjustments when elements other than original cost are considered. As such, original cost is probably as significant an estimate of utility value as can be obtained. If this regulatory value is accepted as the appropriate measure of utility value, it can properly be added to and compared with the value of other wealth instruments, however measured.

The objections to this 'split-inventory' approach are comparable with those leveled at a similar cost approach suggested by Means, Currie, and Nathan in their discussion of income from government activity.³⁶ There the chief objection to the cost approach also seems to be that data obtained on a cost basis would be inconsistent with those obtained for other sectors of the economy; and despite the difference in the nature of governmental activity, the market place approach should nevertheless rule for government-owned assets in order not to distort the over-all picture. But there is this significant difference between governmental activity and regulated utility operations: for government 'output' a market evaluation would have to be imputed; for utility output a market price is available. The latter, however, is set by regulatory action stemming from the regulatory value of utility assets, not by the free interplay of the market. Because of this institutional situation regulatory value is best adapted for estimating utility value; the latter can therefore be combined with the value of other groups of assets in determining total wealth. The apparent lack of comparability of valuation methods as among groups

³⁵ *Studies in Income and Wealth, Volume Two*, pp. 55-6.

³⁶ *Ibid.*, Part Five, especially pp. 303-6.

of assets does not introduce any limitations not basically engendered by society's decision that utility rates be set by regulation.

For purposes of comparing wealth over time, the Conference on Research in Income and Wealth chose 1929, 1939, and 1946. Had regulatory policy since 1929 been substantially what it is today, and had utility accounting since 1929 been at the level it is today, it would be appropriate to compare original or book cost minus depreciation as of each date. But utility accounting has improved greatly since the 1920's, and utility regulatory policy has certainly changed. Until the early 1930's, or at least 1929, cost of reproduction (computed by repricing inventories) minus depreciation (estimated by inspection of physical assets) was the preponderant and ruling approach to regulatory value. By 1939 the situation was part way between that in 1929 and the present. Correcting for changes in accounting principles and practices would be only slightly less difficult than adjusting for shifts in regulatory policy. In either event any attempt in that direction would have to get down almost to individual companies. The volume of detail would be tremendous.

One point more: in the controversy over the relative efficiency of wealth and income estimates for purposes of economic analysis, may I put in a plea for income, if both would serve equally well? Income is more precisely defined and much more susceptible to adjustment for various purposes, especially comparisons over time.

When the question of the relation between income and wealth arises, it is my tentative suggestion that for utilities the claims approach will prove more efficient. The relation will then be defined in terms of weighted yields on market prices of securities.

G SUMMARY

The value of public utility assets approaches and tends to equal their rate-making or regulatory value. As regulation becomes more continuous and effective, the gap between the two tends to narrow. In the absence of a universally accepted standard for

fixing regulatory value, and since actual income may differ from estimated 'fair return', it is impossible to ascertain specific industry-wide value; the best that can be hoped for is to define this value within certain limits. Since regulation sets utility value between cost of reproduction at current prices and original cost, or at either, these established the range. In view of the general use of uniform systems of accounting prescribing utility accounting for fixed assets on an original cost basis, such cost is not only one measure of utility value but also the datum from which the cost of reproduction at any price level can be calculated statistically.

To determine accrued capital consumption is much more difficult. In general, original or book depreciation reserves are an adequate basis for estimating accrued capital consumption. For utilities that have used depreciation accounting for a short time, or have not adjusted reserves to reflect what has been termed 'reserve requirements', adjustment is obviously necessary. It can best proceed on a company basis.

A much more difficult problem, theoretically as well as practically, is presented when an original cost or book depreciation reserve is to be adjusted to reflect accrued capital consumption on a cost of reproduction basis. Appropriate though the indexes to correct such a reserve for changes in price level may be, obsolescence, owing primarily to advances in the arts, makes for a wide margin of error. Since obsolescence due to the incidence of an uncertainty is, strictly speaking, capital consumption on capital account rather than on income account, the problem is not as serious in ascertaining utility income as it is in estimating net value. Therefore a depreciation reserve built up by credits of annual depreciation expense tends to understate accrued capital consumption, even on an original cost basis. The effect of adjusting such a reserve to a current cost basis compounds the error, especially in the light of an ever improving utility technology.

The claims approach resolves into a choice between book and market price values. The former is not an independent check on the direct evaluation of assets, and therefore adds

nothing. The market price of claims may reflect much more than the value of the underlying tangible assets, and that approach therefore yields ambiguous results. Windfall earnings arising from the lag in or ineffectiveness of utility regulation may act to create temporary values, which would be reflected in the market price of the associated claims. However, it is doubtful that the capitalization of such elements gives rise to values permanent enough to be included in estimates of national wealth.

The situation is somewhat different in the case of public utilities that, because of a 'permanently' depressed demand, cannot earn what would be called a fair return by the usual regulatory standards. In such instances it is suggested that the capitalization of maximized monopoly income affords, theoretically at least, a reasonable estimate of utility value. As a practical problem estimating such a value is not only fraught with all the difficulties of ascertaining an adequate capitalization rate but also poses the statistical problem of finding out which utilities are in the category.

In addition there is allocation, a problem not unique to public utilities, of course. In the case of utilities it has three aspects: the separation of two types of utility in the case of combination companies, the separation of utility from non-utility operation, and the allocation of the value of claims. For purposes of dividing the economy into meaningful sectors, some form of allocation is necessary, but poses serious theoretical difficulties. To estimate aggregate value, the theoretical difficulties are less serious, since the purpose is primarily to eliminate duplication and bridge gaps in the data.

If public utility value tends to approach regulatory value, what frame of reference have we for organizations that sell utility services to the public but are not subject to regulation? In this group are utilities operated by governmental bodies and cooperatives which by statute are often exempt from regulation, utilities operating in areas where there is no regulation, and incidental utilities exempt from regulation. A large proportion keep their accounts on a basis approximating that for

regulated utilities. Certain utilities keep no accounts worthy of the name.

As in the case of regulated utilities, original cost minus depreciation reserve, the latter estimated if not available, would seem to be a starting point. Adjustment to some current cost basis would meet difficulties engendered by obsolescence. The approach to valuation would thus be the same for both regulated and nonregulated utilities.

With respect to public utility value in general, we seem to be in the unhappy situation of having to pick the 'least worst' measure. The choice seems to be between original and reproduction cost.³⁷ The latter, usually determined as an adjustment to or revaluation of original cost, is subject to error; original cost has the virtue of being a fact.³⁸ Whatever inadequacy an original cost depreciation reserve may have, the adjustment to current price levels or a given year's price level introduces additional errors.

As yet a satisfactory method does not seem to have been devised for adjusting for obsolescence, especially that occasioned by changes in demand and advances in the arts.

In addition, there is the theoretical difficulty that reproduction cost is not a good measure of economic value for a monopoly industry, and, under certain conditions pertinent to utilities, has an upward bias. Moreover, utility income is fixed more and more on original cost, and when original cost is not the sole criterion, it is the more important.

We seem to be left, more or less by default, with original cost, not because original cost has fewer defects for our purpose but because cost of reproduction has more. In stressing book, or original cost, I do so with the full realization that accounting is in a sense more of an art than a science, and that I may be

³⁷ In a rate case, legal precedent allows for a combination of or a compromise between the two, on the basis of 'administrative judgment'. Within the limits of one utility, such judgment can be meaningful. To exercise such judgment on an industry-wide basis would be precarious.

³⁸ I do not propose to argue how relevant this fact is for a particular regulatory purpose. This paper considers the problem solely from the viewpoint of a national balance sheet.

making a fetish of mere accounting. Yet this 'mere accounting' offers the only data we have for business analysis. And when adjustment yields estimates with an indeterminate error, we must beware of making a fetish of adjustment.

Perhaps I rationalize a vested interest in available data. However, for purposes of devising a national balance sheet as of a recent date, original cost seems to provide the most meaningful available estimate of public utility wealth.

Original cost has had an increasing significance as evidence of 'fair value', and in many jurisdictions has come to be identified with 'fair value' almost as a matter of regulatory policy and procedure. The same is true with respect to the depreciation reserve as a measure of accrued capital consumption.

This statement is not intended to imply that book cost minus depreciation reserve is universally used as a rate base by all commissions, or by any commission all the time. However, I believe this method is given most weight or even preference by a majority of the commissions, and is applied to the major portion of public utility assets.³⁹ The statistical data presented in this paper are on a book cost basis.

On net balance it is my opinion that for the public utility

³⁹ I have not made any exhaustive or precise statistical study to support this belief. However, there are certain indications in addition to general knowledge based on experience in the field. Tables A and B on pages 7 and 8 of *State Commission Jurisdiction and Regulation of Electric and Gas Utilities—1948*, prepared by the Federal Power Commission in cooperation with the National Association of Railroad and Utilities Commissioners, constitute one bit of evidence.

My review of all utility decisions, commission and court, reported in the *Public Utility Fortnightly*, January 2, 1947-April 8, 1948, revealed 29 cases that could be counted as reflecting opinions concerning rate base. In 20 cases book or original cost was used. In two of these a 5 percent allowance above such cost was made to reflect 'consideration of reproduction cost'; in a third a 25 percent allowance was made. Of the other nine cases, four relate earnings to book cost, and in addition relate earnings to investment as reflected by book figures. A fifth uses an undepreciated rate base with a sinking fund depreciation; but since that represented new equipment, there is no indication of what that particular commission would prefer, except that about one year later, again with respect to a small telephone company, it used book cost. The sixth of this group used cost of reproduction depreciated; and the last three used combinations of various elements.

Included in this tabulation are states such as Wisconsin, Pennsylvania, New

sector of the economy not only is income a much more clearly defined concept but also can be ascertained with a materially narrower margin of error.

H SUBJECTS FOR FUTURE CONSIDERATION

This paper contains many gaps, in both statistical data and theoretical analysis, among which the following stand out:

1) The data on tangible assets that could be assembled in the time at my disposal are disappointingly incomplete. Much better coverage could have been attained by compiling balance

Jersey, Massachusetts, Maryland, Georgia, and Louisiana; the individual properties were by no means inconsequential—running as high as \$185,000,000 on a net depreciated basis. Not included in this review were the District of Columbia, California, and the various federal regulatory commissions. Their inclusion would have added to the bodies using book or original cost.

In the above statistical analysis, and throughout this paper, the term original cost was not used in its strict sense as the cost to the person first devoting the property to public use. Original cost, book cost, prudent investment, historical cost, etc. were all used to mean about the same thing—the cost recorded on the books, when the books were kept or have been substantially adjusted to current and accepted uniform systems of account for public utilities. I am aware of differences in meaning among these terms, differences that are significant for certain purposes. However, for purposes of this paper and the estimation of national wealth they are not too important.

I am aware of the argument that in the last few years utilities were in such dire need of speedy rate increases that they based requirements on original cost rate bases in order to remove the question of valuation from the area of controversy. This is undoubtedly true to a certain, though unknown degree. However, it is doubtful that adjustment for this factor would reduce materially the indication that original cost is the most significant, and at times the only, element in determining fair value. Regardless why original cost was used, it is sufficient to note that it was.

I appreciate also the position that the so-called annual charges on account of depreciation expense (regardless whether based on a straight line or any other method) may not and in many cases do not equal the 'actual' depreciation that has materialized during the given year. In fact, the charges to depreciation expense may represent no more than the amount of asset cost amortized during the given accounting period, for the purpose of amortizing the cost of the assets during their life in an acceptable, conventional, and systematic manner. However, to the extent such depreciation, or better, amortization has won acceptance in regulatory valuation policy and practice, it should be reflected in the utility value. In this discussion we are concerned with what commissions do, rather than with what they should do.

sheet data from individual corporate reports published in most instances in financial services such as Moody's, or in annual statements to stockholders. Certain regulatory commissions issue annual consolidated balance sheets for the utilities under their jurisdiction, but not enough for national coverage. Questionnaires sent directly to the utilities offer the sole means of obtaining 100 percent coverage. Even this procedure would fail to bring out all the data for a large number of small utility operations rendering hauling, taxi, warehousing, and forwarding services, since many are not regulated but are merely licensed and as such keep no adequate accounts. It might be possible to obtain only an enumeration of physical assets; placing a net value on these might constitute a rough guess at best. For government-owned utilities too, especially those providing local transportation, water, sewers, etc., it might be necessary to impute a value; accounting information, especially on depreciation, that would be necessary for valuation purposes is often not available. To fill many of these gaps would require a vast amount of work. Merely to collect complete raw data would be a vast undertaking, not the least of which would be to decide from whom and in what form to request data. This may appear to be an unnecessarily detailed procedure, but I know of no other feasible method that would assure complete coverage or give a definitive estimate of coverage.

It was impossible, even for the data gathered, to divide assets into reproducible and nonreproducible; that would have required going to individual corporate reports for the most part. 2) No information was elicited that would allow for the consolidation of claims. The obvious difficulty of obtaining such data precluded also establishing an adequate basis upon which such consolidation should be made. While data are at hand that make possible some form of consolidation of railroad and telephone securities, data for other utilities are not available without considerable research. Many small utilities are not incorporated, and the claims approach becomes confusing. Of course government-owned utilities present a unique situation in this respect.

3) Because of time limitations no attempt was made to construct indexes needed for restating original cost in terms of prices as of any given date. Indexes can be obtained for certain industries such as railroads and telephone companies. As I had no opportunity to check their adequacy I cannot comment. There is little doubt, however, that over-all indexes are of little value. To be useful, indexes should be specific, dealing with major categories of plant for each industry. Such detail, while adding to accuracy, entails a lot of statistical labor. Some compromise is necessary. The general technique of adjusting an original cost to either a current cost or cost-as-of-a-given-date value is akin to that devised by Mr. Fabricant for adjusting capital consumption.

4) Mr. Fabricant has worked out a general theory of price-level adjustment of capital consumption, but in view of the rapid advance in the utility arts and the consequent obsolescence in utility plant, the problem of capital consumption cannot be deemed completely solved even theoretically. Perhaps it never will be. Meanwhile, it would be helpful if a method for estimating the order of magnitude of the effect of such obsolescence were devised. Such an estimate might indicate that I have been straining at a gnat, but I think not.

5) Although for many industries the coverage is incomplete in unknown degree, the data are adequate for computing significant balance sheet ratios. For example, the ratio of current assets to current liabilities, of fixed plant to total assets, of depreciation reserve to depreciable fixed plant, etc. afford useful information. I had hoped to find time to derive these ratios and discuss their implications. Such an analysis would have been useful not only in high-lighting the internal structures of the individual industries but also in showing their role in the economy as a whole.

One note in closing; even after we have adequate data and have made all the necessary and desirable adjustments, we are still faced with the task of ascertaining what Albert Hart has termed 'motivating characteristics', the significant characteristics of the balance sheet that will shed light on the workings of

each sector of the economy. Perhaps working with the data will suggest the questions that may be answered and the additional information needed to answer them. Having formulated the questions, we can then come to a significant analysis of wealth.

APPENDIX A

Extent of Industry Coverage and Source of Basic Data

Group 7211 Line Haul Railroad Companies

Of the Line Haul Railroad Companies, Class I and Lessors cover more than 99 percent of all railroad operations in the United States. Complete data for this class are included in the National Balance Sheet. For Class II and III Line Haul Railroad Companies and Lessors and for Electric Railroads, only selected balance sheet items were available and are included. Source: Statistics of Railways in the United States, ICC, 1946 (worksheets).

Group 7221 Switching and Terminal Companies

For Class I and Lessor Switching and Terminal Companies data are complete, but for Class II and III and Lessors only selected balance sheet items could be obtained. Depreciation reserve for Class II and III and Lessors was estimated. Source: Ibid.

Groups 7231 and 7241 Pullman Company and Railway Express Service

Data for the Pullman Company and Railway Express Service are complete. Source: Ibid.

Groups 7421 and 7521 Motor Carriers

It is estimated that the data cover about 70 percent of interstate carriers of passengers and freight. No estimate of wholly intrastate carriers was found.

Source: Statistics of Class I Motor Carriers, ICC, 1946 (proof sheets).

Group 76 Water Carriers

The only exclusions are water carriers operating within a single harbor or between places in contiguous harbors, craft under 100 tons or 100 horsepower, ferries, passenger vessels with a capacity of fewer than 17, carriers operating wholly intrastate other than those operating on regular routes on the Great Lakes, and tank and bulk carriers. It is estimated that the majority of tank and bulk carriers are owned by steel or oil companies, so that investment is reflected in the balance sheets of those industries.

The 1945 data are distorted by the wartime requisitioning of vessels, subject to later repurchase.

Source: Composite Condensed Balance Sheet as of December 31, 1945, Maritime Commission (preliminary worksheets), and *Statistics of Railways in the United States*, ICC, 1945. Data adjusted to exclude reporting duplications.

Group 7711 Airline Carriers

Scheduled domestic carriers alone included; feeder lines and all unscheduled carriers of cargo and passengers excluded.

Source: Domestic Air Carriers, Comparative Statement of Balance Sheet Data as of December 31, 1946 and 1945, Civil Aeronautics Board.

Group 78 Pipe Line Carriers

All interstate common carriers of oil and other commodities, other than water and natural gas, included; pipe line departments of oil companies excluded.

Source: Statistics of Oil Pipe Line Companies Reporting to the Interstate Commerce Commission, ICC, 1946.

Group 801 Freight Forwarders

An estimated 90 percent of interstate forwarders covered.

Source: Selected Financial and Operating Statistics of Freight Forwarders for 1946, ICC (worksheets).

Group 8111 Telephone

95-98 percent of all telephone companies in the United States covered.

Source: Statistics of the Communications Industry in the United States, FCC, 1946 (worksheets).

Group 8121 Telegraph

Substantially the entire wire telegraph, ocean cable, and radio telegraph industry covered.

Source: Statistics of the Communications Industry in the United States, FCC, 1946 (worksheets).

Group 8131 Radio Broadcasting

Data on radio broadcasting do not adequately cover the industry. Television and frequency-modulation are wholly excluded.

Source: Financial and Employee Data Respecting Networks and Standard Broadcast Stations, FCC, 1946 (preliminary worksheets).

Group 8211 Electric

More than 98 percent of the privately-owned electric light and power industry included. No data are available for the publicly-owned portion of the industry, but the original cost minus depreciation of such utility plant was estimated.

Source: Statistics of Electric Utilities in the United States, 1946, Federal Power Commission.

Group 82 Gas

Degree of coverage unknown.

Source: American Gas Association (unpublished material).

National Balance Sheet, 1946, Exhibit II
Public Utilities
(millions of dollars)

Debtors & Issuers of Stock	Gross Total
I Short term claims on & liabilities of:	
1 Credit institutions	
a) Private institutions	
b) Federal government corporations & credit agencies	
2 Public utilities	6,055 ^a
3 Manufacturing & trade	
4 Mining concerns	
5 Other obligors	
6 Farms	
7 Foreigners	
8 Collectives	
a) Private nonprofit institutions	
b) The rest of government	
9 Households	
10 Total	
II Long term claims on & liabilities of:	
1 Credit institutions	
a) Private institutions	
b) Federal government corporations & credit agencies	
2 Public utilities	21,808 ^b
3 Manufacturing & trade	
4 Mining concerns	
5 Other obligors	
6 Farms	
7 Foreigners	
8 Collectives	
a) Private nonprofit institutions	
b) The rest of government	
9 Households	
10 Total	
III Stock issued by:	
1 Private credit institutions	
2 Public utilities	20,297 ^c
3 Manufacturing & trade corporations	
4 Mining corporations	
5 Other domestic corporations	
6 Foreign corporations	
7 Total	

^a Excludes Class II and III railroads and lessors, Class II and III switching and terminal companies and lessors, radio broadcasting, and publicly-owned electric utilities.

^b Excludes radio broadcasting and publicly-owned electric utilities.

^c Excludes Class I motor carriers, with an aggregate corporate and noncorporate capital of \$234 million; all water carriers not filing with the ICC, with an aggregate corporate and noncorporate capital and surplus of \$622 million; and stock of radio broadcasting corporations.

National Balance Sheet, 1946, Exhibit I: Public Utilities (millions of dollars)

TYPE OF ASSET OR CLAIM	LINE HAUL RR. CO.		SWITCHING & TERMINAL CO.		WATER CARRIERS								
	Class I & lessors	Class II & III & lessors	MISC. RY.	Class I & lessors	Class II & III & lessors	PULLMAN CO.	RY EXP. SERV.	CLASS I INTERSTATE	Anchor flag-for serv. (yr. 1945)	Coastwise (yr. 1945)	Intercoastal (yr. 1945)	Reporting to the ICC (yr. 1945)	DOMESTIC AIRLINE CARRIERS
I Resumé of claims													
A Assets for holders													
1 Currency	873		16	23					53	31	12	20	170
2 Demand & time deposits	1,273			10		38		328	112	80	34	36	
3 Other short term claims	1,296			42			7						
4 Long term claims		23	15	28	52			55	206	49	41	33 ^a	52 ¹
5 Stock	4,667												
6 Direct investment abroad ^a													
7 Total above assets (1-6)	8,109	d	d	103	d	38	59	383	371	160	87	89	222
B Liab. & prop. of holders													
8 Short term claims due others	3,130		28	62		31	56	295	95	39	13	23	116
9 Long term claims due others	11,032	161	44	582	131		26	122	80	20	1	13	90
10 Prop. equity, corp. units	14,492	134	52	169	138	23	2	467	436	169	60	101	186
11 Prop. equity, noncorp. units													
12 Direct for. invest. in U.S.													
13 Total claims & eq (8-12)	28,654	d	d	813	d	54	84	884	611	228	74	d	392
C Net claims held (7 minus 13)	(20,545)	d	d	(710)	d	(16)	(25)	(501)	(240)	(68)	13	d	(170)
II Reproducible assets in U.S.													
1 Residential buildings													
2 Other structures													
3 Roads & streets													
4 Machinery & equipment													
5 Rolling stock													
6 Inventory ^a													
7 Livestock													
8 Consumer goods													
9 Monetary gold & silver													
10 Subtotal (1-9)	20,514	d	248	706	d	15	23	445	240	67	(11)	59	171

National Balance Sheet, 1946, Exhibit I (concl.)

[illegible]

B Liab. & prop. of holders											
8 Short term claims due others	72	23	544	75	1,116	277	34	26	6,055		
9 Long term claims due others	74	2	1,844	93	6,196	1,025	167	105	21,808		
10 Prop. equity, corp units	374	6	3,035	227	7,395	1,550	250	166	28,300	29,432	57,295
11 Prop equity, noncorp. units											
12 Direct for. invest. in U.S.											
13 Total claims & eq. (8-12)	520	31	5,423	395	14,707	2,852	451	297	56,470		
G Net claims held (7 minus 13)	(389)	(1)	(4,343)	(271)	(12,147)	(2,225)	(383)	(223)	(42,244)		
II Reproducible assets in U S											
1 Residential buildings											
2 Other structures											
3 Roads & streets	373	2	4,345	257	11,625	1,088 ¹	383		39,697	41,466	
4 Machinery & equipment											
5 Rolling stock											
6 Inventory ^a	17			15	311				1,028		
7 Livestock											
8 Consumer goods											
9 Monetary gold & silver											
10 Subtotal (1-9)	390	2	4,345	272	11,936	1,088	383	224 ^m	43,395		
III Nonreproducible assets in U.S.											
1 Land ^b											
2 Subsoil assets ^b											
3 Collectors' items											
4 Subtotal (1-3)											
IV Goodwill & related intangibles ^c					211		5	3	306		
V Total assets other than claims (II 10 + III 4 + IV)	390	2	4,345	272	12,147	2,227	386	224	42,250		

^a May exist in an undetermined amount. If held, would be included under A4 or 5

^b Included under II 1-5.

^c Including materials and supplies. When not listed separately, are included under II 1-5 or 1-6 unless otherwise noted.

^d Selected balance sheet items only.

^e Depreciation data not available. Net plant estimated on the basis of the ratio of depreciation and amortization reserve to gross plant of Class I and lessor railroads

^f Depreciation data not available. Net plant estimated on the basis of the

ratio of depreciation and amortization reserve to gross plant of Class I and lessor switching and terminal companies ^g May be included in II 1-5.

^h Incomplete total; selected balance sheet items only

ⁱ Includes materials and supplies, classifiable under II 6.

^j Less than \$500,000.

^k Acquisition cost of tangible broadcast property minus depreciation since acquisition.

^l Estimated original cost minus depreciation.

^m Not classified under II 1-5 since believed to include large amounts of land and/or subsoil assets.

APPENDIX B

Scope of Aggregates

It will be noted that there are three 'Total' columns for each industry. The 'Total Each Line' is the aggregate of the values on that line for each industry. However, for certain industries either the values for a particular item were not available or values could be definitely classified only as within a group of items or lines. The 'Total Subgroups' aggregate the values for particular items and the values for items classifiable only within a group of items. The 'Total Groups' is the third step, aggregating values for individual lines, values classified in subgroups, and overlapping subgroups or values classifiable only as included within the group.

Since Urban Transit (Industry 73 and 7411) is excluded from the totals and the extent of coverage of each industry is only as defined by reference to Appendix A, the figures best representing aggregate Public Utility Balance Sheet data are: *Item I A, Assets for Holders*, \$14,421 million. This figure excludes Radio Broadcasting (Industry 8131), Publicly-Owned Electric Utilities (Industry 8211), and some assets of Class II and III Railroads and Lessors, Electric Railways (Industry 7211), and of Class II and III Switching and Terminal Companies (Industry 7221).

Item I B, Liabilities and Proprietorship for Holders, \$57,295 million. This figure has the same exclusions and partial exclusions as the preceding.

Item II, Reproducible Assets in the United States, \$43,908 million. This figure totals the Line Total of Item II 10 (\$56,470 million) Class II and III Railroads and Lessors, and Class II and III Switching and Terminal Companies and Lessors, for which partial information only was available; Land and Subsoil Assets, classifiable under Item III, are included.

Item V, Total Assets Other than Claims, \$44,218 million. This figure totals the Line Total of Item V, plus the partial data for

Reproducible Assets included in Class II and III Railroads and Lessors, Electric Railways, Class II and III Switching and Terminal Companies and Lessors, Water Carriers Reporting to the ICC, Radio Broadcasting, and Publicly-Owned Electric Utilities.

The Nonfarm Business Inventory Component

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MEASUREMENT OF THE BUSINESS INVENTORY component of national wealth raises many problems, among which those relating to the 'book' value of inventories can be distinguished from those concerned with the deflation of book values.¹ Attention is directed in this paper to the former: the definition of inventories; the scope of the cost elements in the inventory valuation; and the significance of, and ambiguities arising from, the various costing procedures in general use. Estimates of both the book value and the deflated value of nonfarm business inventories are presented for 1929, 1939, and 1946. The source materials used in preparing the inventory estimates are described with special emphasis on the reasons for estimating the corporate and noncorporate sectors separately. The problems involved in deflating the book value of inventories for changes in the unit cost of goods in stock between inventory dates are merely touched upon.²

The inventory aggregates presented in Table 1 are part of the series used in estimating the change in nonfarm business inventories and the inventory adjustment in the national income and product totals of the Department of Commerce.³

¹ In a national balance sheet the year-end 'book' value of business inventories is a fairly close approximation, as wealth estimates go, to 'current value' because most inventory components, unlike the majority of tangible assets measured in a wealth estimate, are replaced many times a year and the inventory costing procedures in general use, as explained in Section B2, are such as to yield a fairly current price-level valuation.

² The basic problem of inventory deflation is discussed fully by Simon Kuznets in his *Commodity Flow and Capital Formation* (NBER, 1938) and by Solomon Fabricant in *Studies in Income and Wealth, Volume One* (NBER, 1937).

³ The relation between the inventory aggregates and the inventory increments in the national income and product estimates may be explained briefly. Total business inventories were compiled at successive points in time as a first step in computing the current value of the net change in business inventories, a component of gross private domestic investment in gross national product.

The necessity of deriving the net physical change in business inventories from aggregate book values for successive periods, however, gives rise to the cumbersome task of disentangling the portion of the change in the book value due to the physical increase or decrease in the quantity of goods stored from the portion due to the change in unit prices. To accomplish this end, the book values of the beginning and ending inventories of each period were deflated, industry by industry, to constant (1939) prices. The year-to-year net change in

Table 1
Book Value of Year-end Nonfarm Business Inventories,
1929, 1939, 1946
(millions of dollars)

	Mfg.	Trade	Mfg. & trade	Mining & quarrying	Public util. ^a	Finance, insurance, & real estate ^a	Other ^b	Total
CURRENT PRICES								
<i>1929</i>								
Corporate	12,720	5,991	18,711	702	1,175	699	714	22,001
Noncorp.	531	5,410	5,941	89	..	..	396	6,426
Total	13,251	11,401	24,652	791	1,175	699	1,110	28,427
<i>1939</i>								
Corporate	11,129	5,260	16,389	323	723	45	519	17,999
Noncorp.	387	3,522	3,909	33	..	..	203	4,145
Total	11,516	8,782	20,298	356	723	45	722	22,144
<i>1946, prelim.</i>								
Corporate	23,630	10,860	34,490	344	1,439	70	1,204	37,547
Noncorp.	781	6,722	7,503	47	..	..	562	8,112
Total	24,411	17,582	41,993	391	1,439	70	1,766	45,659
1939 AVERAGE PRICES								
<i>1929</i>								
Corporate	10,944	5,073	16,017	596	1,177	608	602	19,000
Noncorp.	435	4,661	5,096	76	..	..	370	5,542
Total	11,379	9,734	21,113	672	1,177	608	972	24,542
<i>1939</i>								
Corporate	10,832	5,085	15,917	313	714	44	510	17,498
Noncorp.	367	3,416	3,783	32	..	..	200	4,015
Total	11,199	8,501	19,700	345	714	44	710	21,513
<i>1946, prelim.</i>								
Corporate	15,919	6,469	22,388	242	998	43	700	24,371
Noncorp.	457	4,095	4,552	33	..	..	352	4,937
Total	16,376	10,564	26,940	275	998	43	1,052	29,308

^a No data available for noncorporate holdings, which are believed to be small

^b Chiefly construction and service industries.

A SCOPE OF THE ESTIMATES

Business inventories cannot be precisely defined. Instead such common-knowledge terms as 'merchandise', 'finished goods', 'goods in process', 'raw materials', and 'supplies' must serve

inventories in constant prices was then revalued in terms of the average current prices for the period under consideration, yielding the measure desired for inclusion in gross national product. ('Change in business inventories' as it appears in the published gross national product tables includes farm inventories, which are not covered in this paper.) The difference between the change in the book value of the terminal inventories of each period and the current value of the physical change in inventories, as derived above, appears as an adjusting entry, 'inventory valuation adjustment', in national income.

to suggest their content.⁴ In general, the goods and materials represented by these terms are characterized by the fact that they are destined for sale in the normal course of business or for use in the productive process, and by their relatively high rates of turnover. The former characteristic distinguishes business inventories from personal inventories; the latter distinguishes many types of supplies conventionally classified as 'inventory' from capital assets, which, of course, are also 'used in the productive process'.

Whatever the formal definition of inventory, the basic sources upon which we are dependent for estimates of business inventories measure the aggregate of commodities classified as 'inventories' by the business community itself. While the main body of the inventory account is relatively unambiguous, the scope of the assets included at the periphery varies with the accounting practice. The variety of accounting treatment is notable in the case of many miscellaneous small assets such as replacement parts, dies, patterns, small tools, containers, and office supplies.

Miscellaneous assets of this type pose two major difficulties for the estimator of national wealth. The one is largely a matter of classification, the other of omission. These assets may be classified on the balance sheet as part of plant and equipment, inventories, or deferred charges. To the extent that they are classified as inventories or as capital equipment they will be included in an over-all wealth estimate based on balance sheet data, though their distribution between these two accounts may be unknown. To the extent that they are classified as deferred charges it will be necessary, in using the substantive

⁴ *Accountants' Handbook*, W. A. Paton, ed. (Ronald Press, 1943, 3d ed.), p. 517, for example, cites the following definition from Montgomery, *Auditing Theory and Practice*: "In general, merchandise bought for resale, finished and partly finished goods manufactured for sale . . . and materials and supplies purchased for use in production constitute a concern's inventory."

Strictly speaking, materials and supplies used in production need not be purchased. Many vertically integrated companies produce much of their own raw material. See also 'Accounting Research Bulletin 29: Inventory Pricing', Committee on Accounting Procedure, American Institute of Accountants, *Journal of Accountancy*, Sept. 1947.

approach to the measurement of national wealth, to include a portion of this account (i.e., the real assets as distinguished from paper claims) to ensure full coverage.

The second problem is that miscellaneous small assets are not only variously classified on the balance sheet but also in many cases are omitted altogether. For example, when supplies are issued they are commonly treated as expended items, that is, transferred from the asset account (on the balance sheet) to the expense account (on the profit and loss statement). At any given time, however, a considerable volume of issued supplies may be on hand. These items are in the anomalous position of being fully written off in financial terms but not fully consumed or used up. Moreover, many firms do not maintain supply accounts but charge their expenditures for such items to current operating expense; in this case the unissued as well as the issued supplies are 'omitted' from the balance sheet. Therefore to cover this category of 'omitted' supplies in a national wealth estimate it will be necessary to go beyond the scope of ordinary commercial balance sheets.

The content of the inventory account varies also with the type of industry, occasionally embracing assets not ordinarily associated with 'inventories'. In the film industry, for example, inventories consist mainly of the production costs incurred to date on films in process and on films completed but not yet released; the residual costs of films released, i.e., the difference between the total cost of each film and the amortization accrued from the date it is generally released; and the costs of screen rights to books, plays, and scenarios. Since films are rented, not sold, the cost of film production is amortized against the rental income in accordance with a weekly table, established for tax purposes with the approval of the Bureau of Internal Revenue. The book value of these inventories in recent years has been roughly a quarter of a billion dollars. Dealers in securities afford another unusual example. Until 1936 the Bureau of Internal Revenue classified the securities held by stock and bond brokers as inventories. These inventories, which amounted in 1929 to approximately \$300 mil-

lion, have been omitted from our estimates on the ground that they represent claims to assets, not real assets.

Two additional points relating to the scope of the inventory estimates should be noted. (a) The fact that certain production may be 'in process' does not necessarily mean that it will appear in the inventory account. For example, in the case of large scale projects such as buildings, roads, and battleships, which involve large sums of money and are produced under specific contracts rather than for the open market, it is fairly common practice to set up separate asset accounts for the unbilled charges incurred and to treat them, in effect, as accounts receivable.⁵ A similar procedure was followed during the war in the case of work done under 'cost plus fixed percentage' contracts. Since partly completed assets of this nature are not covered in inventories, they may be missed in the substantive approach to the national wealth estimate unless special provision is made to include them.

(b) Goods in transit present an especially difficult problem. Bureau of Internal Revenue regulations indicate that they should be included in the inventory of the concern that holds title to them.⁶ The problem of precisely when title passes, however, has many obscure ramifications which lead ultimately into the law of contracts. Many accountants, therefore, do not recognize goods in transit until they have been received. Hence, as of any given date a considerable volume of goods is in a statistical limbo: they have been eliminated from the inventories of the seller but not yet added to the inventories of the buyer. Apparently, the precise manner in which the buyer handles goods in transit is not of great concern to the Bureau of Internal Revenue. For if goods in transit are added to the

⁵ On small construction jobs, however, the practice is quite varied and whether a partly finished structure is classified as inventory or as a receivable may depend upon whether the contractor is paid in stages as the work progresses or is paid upon completion of the job; see *Accountants' Handbook*, p. 398.

⁶ Bureau of Internal Revenue regulations or practices are referred to frequently because data reported to it by business concerns on income tax returns are the main source underlying our estimates; see Section C for a discussion of source materials.

acquisitions of the current year, they must be subtracted from the year-end inventory, so that the cost of goods sold will be the same with or without goods in transit and therefore will not affect the taxable income.

According to balance sheet information in *Moody's Industrials* many large corporations do show a separate 'goods in transit' category for inventories; but there is no way of ascertaining how complete the coverage is. Furthermore, there is some presumption that a substantial, if not the major, portion of the reported in-transit inventories reflects the movement of commodities between subsidiary plants of parent corporations rather than between independent buyers and sellers. Corporations with subsidiaries can more readily account for goods in transit and are inclined to do so in order to have more comprehensive financial reports and better management controls. In the absence of further data, we can merely note the probability of considerable omission on this score.

A rough computation suggests that the average value of goods in transit via rail alone amounted to approximately three-quarters of a billion dollars in 1939. This computation is based upon (a) an Interstate Commerce Commission estimate which places the value of commodities transported on Class I steam railways in the United States during 1939 at \$40,042,-370,000;⁷ (b) the assumption that the average freight haul, including loading and unloading time, lasts about seven days (suggested by data from the Interstate Commerce Commission, Cost Section). While the basis for corresponding approximations to the value of goods in transit via other modes of transport is not readily available, the estimate for railroads clearly indicates the substantial magnitude of the combined total.

B THE GENERAL PROBLEM OF VALUATION

Accountants make two basic pricing determinations that affect the book valuation of inventories. The first relates to the scope

⁷ *Freight Revenue and Value of Commodities Transported*, Statement 4045, File 18-G-23, Oct. 1940 (mimeographed release).

of the cost elements to be included in the inventory account. To what extent should inventory values reflect indirect or overhead costs as well as direct costs? The second relates to the costing procedures used to charge goods to cost of sales and to inventories respectively, and fixes the period to which the prices reflected by the inventory book values pertain.

1 *Scope of the Cost Elements Included in the Inventory Account*

In general, accountants tend to distinguish between direct costs, notably material and labor costs, which may readily be related to the flow of goods through the concern and are therefore reflected in the inventory account; and indirect costs or 'burden', which cannot be readily related to the product flow. Obviously, the policies concerning the cost elements to be included in the inventory account represent a primary allocation that will affect the book valuation of inventories at any given time.

Theoretically, it would seem that for purposes of a wealth estimate the valuation of business inventories should take into account all the expenses of bringing the goods in inventory to their present stage of production. Thus the value of the ending inventory should reflect a pro rata share of all costs incurred during the accounting period except those uniquely related to the selling function, i.e., that are for services rendered after the goods leave inventory.

In most industries, however, it is almost impossible to trace adequately the complete cost history of each commodity. The complexity of industrial processes together with the enormous diversification of final products introduce cost allocation problems for which there are no definitive solutions. This is not to say, of course, that cost allocations are not made, but rather that they are made in accordance with widely divergent principles and accounting practices.

The diversity of prevailing accounting procedures is clearly recognized in the Bureau of Internal Revenue regulations concerning inventories for income tax purposes. The regulations

are so broadly drawn that they must be looked upon more as a statement of recommended procedures than as a precise body of definitions that must be adhered to. This point of view is clearly noted in *Regulations 111*, Sec. 29. 22 (c)-2; "Section 22 (c) provides two tests to which each inventory must conform: (1) It must conform as nearly as may be to the best accounting practice in the trade or business, and, (2) It must clearly reflect the income. It follows, therefore, that inventory rules cannot be uniform but must give effect to trade customs which come within the scope of the best accounting practice in the particular trade or business. In order clearly to reflect income, the inventory practice of a taxpayer should be consistent from year to year, and a greater weight is to be given to consistency than to any particular method of inventorying or basis of valuation so long as the method or basis used is substantially in accord with these regulations."

This introductory section to the regulations on the valuation of inventories seems to suggest that each type of business generally follows a standard practice, whereas, in fact, numerous accounting procedures and rule of thumb methods are employed. The *Accountants' Handbook* (p. 221) reports recent surveys as showing "a wide variation in cost accounting methods, with a lack of any method worth mentioning in many of the smaller companies. As might be expected, the greatest variation in methods occurs in connection with the computation of overhead. Rates varying from 50 percent to 500 percent of direct labor have been reported for individual concerns in the same industry, with a large part of the range obviously due to variation in methods of computation rather than to differences in conditions."

In view of these considerations, the costs represented in the book value of inventories tend to be extremely heterogeneous and may involve a significant understatement of the true costs of production. It is impossible to determine the extent to which each major type of cost is included in the book value of inventories in the summary compilations. The range, however, appears to be from virtually complete exclusion in the

case of interest, profits, and many types of general administrative expense (the limits of which are very ambiguous) to almost complete inclusion in the case of such costs as raw materials and direct labor. Between these two extremes ranges the broad array of costs subsumed under 'burden'.

Since the scope of the cost elements in the book valuation of inventories may vary from concern to concern, the aggregate value for the business sector of the economy can be defined only obliquely as the sum of all costs that do not happen to be deducted from current revenues (or set up as deferred charges). The understatement of 'true' inventory costs has long been debated. The essence of the present argument has been well stated in an article in the *Journal of Accountancy* for October 1941 by William A. Paton, editor of the *Accountants' Handbook*:

"... what are the limits of the area of charges which may reasonably be funneled through the inventory? . . . At one extreme is the view that only the net invoice cost of merchandise or materials, plus the direct costs of production in the case of conversion or manufacturing, are inventoriable. At the other extreme is the broad interpretation of operating charges, which considers virtually all costs necessarily incurred in the activity of the enterprise as attaching . . . to the stream of tangible goods flowing through the business, from the raw-material stage to that of finished product ready for consignment to customers. From this point of view all classes of burden or overhead costs, including so-called 'general' and 'administrative' charges, are factors in the measurement of the cost of inventories at any time that activity is viewed as momentarily arrested; the president's salary, for example, is no less inventoriable, than the wages of a workman operating a lathe in the plant . . .

. . . the amount of the periodic inventory may be greatly affected by the general policy adopted with regard to the kinds or classes of costs considered to be inventoriable; the committee on accounting procedures and accountants generally will do well to keep this fact in mind in dealing with those phases of the inventory problem which have been most actively discussed in recent years. To spar endlessly over pricing alternatives which involve, say, a 10 percent

variation in total, and entirely ignore an area of policy which may easily mean a variation of 50 percent in the final determination smacks of the lack of sense of proportion of which auditors have often been accused."

While the precise proportion of the costs not included in the book value of inventories is unknown, some inferences concerning its size may be drawn from the data on total deductions from current revenue in *Statistics of Income for 1939*, Part 2 (see Table 2). Since the book value of inventories tends by and large to include only the elements of costs that are classified as 'cost of goods sold' (and, in the Bureau of Internal Revenue tabulations, 'cost of operations'), the remaining array of costs will give some indication of the nature and relative size of the excluded costs. The following statement from *Statistics of Income* (Part 2, p. 17) is pertinent to the interpretation of Table 2 (and indirectly emphasizes the diversity of accounting practices).

" 'Cost of goods sold' and 'Cost of operations' include taxes, depreciation, and salaries and wages, only to the extent that these

Table 2
Summary of Deductions from Total Compiled Receipts of
Corporations, 1939
(billions of dollars)

	All in- dustries	Mfg.	Trade
Total compiled deductions	125.7	54.7	41.9
Cost of goods sold	77.3	41.2	32.9
Cost of operations	11.1	0.6	0.5
Compensation of officers	2.7	1.0	0.8
Rent paid on business property	1.6	0.3	0.7
Repairs	1.1	0.7	0.1
Bad debts	0.7	0.2	0.2
Interest paid	2.8	0.3	0.1
Taxes paid	4.0	1.6	0.4
Contributions or gifts	*	*	*
Depreciation	3.4	1.4	0.3
Depletion	0.4	0.2	*
Net capital loss	0.1	*	*
Net loss, sales of property other than capital assets	0.2	*	*
Other deductions	20.2	7.0	5.9
Cost of goods sold & of operations	88.4	41.8	33.4
All other deductions	37.3	12.9	8.5

Statistics of Income for 1939, Part 2, Table 3.

* Less than \$0.05.

deductions are reported as part of such costs. Amounts of these items which may be allocable to 'Cost of goods sold' or to 'Cost of operations' but which are reported elsewhere on the returns are tabulated in the appropriate deduction items in the cases of 'Taxes paid', 'Depreciation', and 'Depletion', and in 'Other deductions' in the case of salaries and wages. If other deduction items, such as 'Rents paid', 'Interest paid' and 'Compensation of officers' are definitely shown in 'Cost of goods sold' and 'Cost of operations', adjustment is made, and such items are transferred to their appropriate classifications."

According to the Bureau of Internal Revenue, the reallocation of 'rents paid', 'interest paid', and 'compensation of officers' from the cost of goods sold and the cost of operations to the appropriate deduction classification is made in relatively few cases and is very minor quantitatively. An important point the Bureau stresses in this connection is that it is concerned less with the formal content of the statistical tabulations (though it is constantly taking steps to improve the character of the data) than with ascertaining that each individual report is reasonable and consistent. In other words, the Bureau of Internal Revenue is less interested in whether a particular expense is counted as a part of the cost of goods sold or included with some other deduction than in the fact that it is counted only once.

From Table 2 it will be noted that in 1939 aggregate costs of the type that tends to be excluded from the inventory account were \$37.3 billion for all corporate industries combined, \$12.9 billion for manufacturing, and \$8.5 billion for trade. What proportion of these aggregates should be reallocated to the inventory account to reflect the true cost of production cannot be stated at this time; however, the figures suggest that the amounts involved may be substantial.⁸ The understatement of

⁸ Logically, an adjustment to the value of the ending inventory might be indicated also for net profits (which in 1939 amounted to \$7.2 billion for corporations) on the ground that profits are not a unique reward for selling a commodity to the exclusion of any return for financing, organizing, and directing its physical production. Hence to exclude profits from the value of the ending inventory is—in a free enterprise system—to exclude an important element of

ending inventories on this account is probably largest in manufacturing industries; considerably smaller in trade, where selling represents the primary aspect of production; and probably negligible in the service industries, where inventories consist of supplies and the significant unit of production is a service rather than a commodity.

Adjustments along these lines would obviously entail considerable difficulty. Until the problems are explored more fully we can do little more than indicate that the undervaluation of inventories implicit in accounting procedures is a significant factor conditioning the use of our estimates for certain purposes. The comparability of inventories with other assets in the national balance sheet, for example, might be seriously impaired. Since most assets are finished commodities or structures, they tend to be valued at some kind of market price, such as original cost, reproduction cost, or current market price. Therefore, the value of such assets necessarily embraces, at least in theory, all the cost elements, including profits, incurred in their production. The book value of inventories, on the contrary, embraces only the cost elements that accountants 'recognize' on the basis of numerous and diverse accounting standards.

Over time inventories are probably more comparable, since book values are understated for all years. But an interesting point for speculation may be raised even here. In an economy with a constant price level and a constant physical quantity of inventories, the book value of inventories could still rise appreciably over a long period merely because of the gradual adoption of broader cost accounting systems tending to allocate a higher proportion of pertinent costs to the inventory account.

The problem presented by the omission of certain cost elements from the inventory account is fundamentally different in the case of a wealth and of an income (or product) estimate.

cost. In terms of national income, to count the entire profit earned on the sale of the beginning inventory as part of the income of the period in which the sale is made is, in effect, to count as part of the national income of the current year a factor return that was partly earned in the preceding year.

In the latter it is essentially one of timing. Since the entire cost of the inventory at the end of one period is charged to the revenue of the succeeding period, whether more or fewer costs are charged to the inventory account will determine merely whether more or fewer costs will be charged to the current or to the succeeding period. As in the course of the two periods, all the relevant costs will be deducted from the stream of revenue, the net income of the two periods combined will not be affected by the allocations.⁹ The problem of timing is, of course, highly significant and warrants consideration on its own merits. However, in the case of a wealth estimate the current accounting practices mean that a significant area of costs is never included in the value of the inventory asset.

For any given period, the 'error' resulting from the cost undervaluation of inventories is far larger, absolutely, for a wealth than for an income or product estimate. The wealth estimate is too low by the amount by which the entire stock is undervalued, whereas the income or product estimate is in error (plus or minus) only by the amount by which the increment to the stock is affected.

2 *Costing Procedures*

Whereas the physical units of goods and materials of each type that flow through the inventory account of a business concern during an accounting period are essentially homogeneous, the unit costs at which they are acquired (purchased or produced) are continuously changing. It is usually impracticable, if not impossible, to link specific goods to specific costs. Accountants must decide therefore what unit costs are to be attached to goods sold and what to the goods remaining in the inventory as of any given date. To make this determination several basic costing procedures have been developed on the manner in which inventory costs are to be allocated. These procedures are of special interest here. For to the extent that

⁹ This appears to be at the root of Bureau of Internal Revenue emphasis upon consistency as a cardinal principle in its regulations on inventory practices: *III*, Sec. 29:22 (c)-2.

concerns value their inventories at cost (whether on a straight cost basis or the lower of cost or market)¹⁰ the value of the inventory at the end of any given accounting period represents, in effect, the residual costs that have not been charged out as cost of goods sold.

The Internal Revenue Code takes cognizance of three general methods of charging out inventories: the first-in, first-out (FIFO) method which, as the name suggests, assumes that costs are charged out in the order in which they are incurred; the specific identification method, which can be used only when specific costs can be linked to specific goods—these costs are charged out only when the particular items are sold; and the ‘elective method’, under which, for the most part, the costs most recently incurred are charged out first.¹¹ A fourth method, not specifically mentioned in the Bureau of Internal Revenue regulations but fairly common, is the weighted average cost method. It reduces all the unit costs incurred during an accounting period to one level so that the order in which they are charged to sales is no longer significant. There are several variants of the average cost method.

According to Treasury officials questioned on this point, the FIFO method is used most extensively for tax reporting purposes. It tends to value the year-end inventory at the cost prices at which it was physically accumulated. The period to which these costs pertain may be approximated from the average age of inventories as indicated in stock turnover ratios, that is, the ratio of the year-end inventories to the cost of goods sold. The period of accumulation indicated by these ratios tends to vary between three and six months in most industries. In trade, however, it is approximately two months.

The specific identification method is not feasible for most industries because of the difficulty, if not impossibility, of trac-

¹⁰ These are the two main bases of valuation distinguished by the Bureau of Internal Revenue for income tax purposes. The method chosen must be followed consistently from year to year in order to “clearly reflect” periodic income or loss.

¹¹ Special methods are permitted for certain industries, such as farming, mining, and retail trade; these, for the most part, are variants of the general methods.

ing the costs to individual items in the inventory unless the units are relatively few and the unit value is relatively large. However, as far as this method is used, the cost value of the ending inventory tends to approximate the level of costs obtained by the FIFO method, because goods in inventory tend to be used up in the order in which they are acquired, especially if they are subject to style changes, obsolescence, or any kind of physical wastage or spoilage.

Since the period to which the average cost pertains is ambiguous, the method is frowned upon by the Bureau of Internal Revenue.¹² The precise definition of average cost will obviously depend upon whether costs are averaged for a month, a quarter, or a fiscal year. However, when continuous inventories are maintained (as is customary in most industries) the effective average tends to become a moving average which is modified by the current cost of each new increment to the inventory or by the sum of the increments added during a specified interval. Hence, given the usual rate of turnover in most industries, the average costs reflected in the year-end inventory will be heavily weighted by the prices prevailing in the closing months of the year and hence will approximate the cost levels obtained by the FIFO and the specific identification methods. However, the valuations of the ending inventories computed by these three methods are merely crude approximations, and in extreme cases may differ substantially. In the absence of the requisite statistics on the precise methods followed in each industry and the extent to which each method is used by type of inventory, the assumption of approximate similarity is the most feasible working hypothesis. The above considerations

¹² The Bureau of Internal Revenue position with respect to the use of average costs is difficult to pin down. The method is not mentioned in the Regulations as an allowable procedure; on the other hand, it is not specifically disallowed. In general, the position is that if firms have been using this method consistently for a long period they may continue, subject always to review by the Treasury examining officers in the field. The point is also made that some firms use the average cost method for purposes other than tax reporting so that a survey showing the number of firms using this costing method in general practice will not necessarily indicate the number using it for tax purposes.

suggest that this hypothesis does not conflict unduly with the underlying data.

The 'elective method' was introduced for general use in the 1939 Revenue Act. It permits the taxpayer to establish what is tantamount to a base stock and to maintain this stock at the fixed average cost of the opening inventory of the taxable year in which the method is adopted. For each successive year the costs flowing through the inventory account are arranged in chronological order and the charge to sales may be made on a first-in, first-out basis, a last-in, first-out basis, an average cost basis, or "pursuant to any other proper method which in the opinion of the Commissioner clearly reflects income".¹⁸ The residual value of the units not charged to sales on the basis of these alternative methods is added to the value of the beginning inventory to yield the value of the ending inventory. (The last-in, first-out variant is so generally used by firms adopting the elective method that it is almost universally referred to as the 'last-in, first-out' method—LIFO.) Thus to the base stock valued in base-year prices may be added successive annual increments valued in terms of the prices of the years in which each increment is made. If the units sold in any given year exceed the number acquired, this process is reversed. The most recent increment is subtracted first from the value of the beginning inventory, then the increment of the next earlier year, and so on back to the base stock.

Since the LIFO valuation of inventories thus involves several strata of price levels, it is extremely difficult to determine the period to which the value pertains. Indeed, if this method were employed universally, or even extensively, it would not be possible to use the book value of inventories as an approximation to the current value of goods in stock without making major adjustments.

A sample survey by the National Income Division based on *Moody's Industrials* reports covering 1940-45 indicates that less than 5 percent of the total value of business inventories were valued on a LIFO basis. It is difficult to evaluate the sam-

¹⁸ *Regulations 111*, Sec. 29.22 (d)—1.

ple data, however, because many firms use the LIFO method for only part of their total inventories and usually do not indicate the proportion. The sample shows that for manufacturing the LIFO method is concentrated in the meatpacking, non-ferrous metals, leather, petroleum, lumber, and paper industries. Less than 10 percent of all manufacturing inventories are valued on a LIFO basis.¹⁴

The interpretation of the book value of ending inventories is complicated not only by the somewhat ambiguous nature of the cost basis of valuation but also by the fact that concerns following the lower of cost or market rule may set aside the former in a period of declining prices in favor of the latter.¹⁵ What is meant by 'market' in the familiar lower of cost or market formula, the Bureau of Internal Revenue regulations point out, is the replacement cost at the date of the inventory: "(a) of goods purchased and on hand, and (b) of basic elements of cost (material, labor, and burden) in goods in process of manufacture and in finished goods on hand . . ." ¹⁶ Moreover, the regulations require that the cost-market comparison be made separately for "each article on hand at the inventory date".

¹⁴ In estimating the change in business inventories in gross national product, a rough adjustment is made for LIFO inventories for each of these six manufacturing industries. As a result of this adjustment, LIFO inventories are, in principle, properly valued in the constant dollar estimates in Table 1.

¹⁵ Attention is called to the additional complication, probably not important quantitatively, that under both the cost and lower of cost or market bases write-downs of goods are permitted because of such factors as physical deterioration, obsolescence, and imperfections; see *Regulations 111*, Sec. 29.22 (c)—2.

¹⁶ *Regulations 111*, Sec. 29.22 (c)—3: "Where no open market exists or where quotations are nominal, due to stagnant market conditions, the taxpayer must use such evidence of a fair market price at the date or dates nearest the inventory as may be available, such as specific purchases or sales by the taxpayer or others in reasonable volume and made in good faith, or compensation paid for cancellation of contracts for purchase commitments. Where the taxpayer in the regular course of business has offered for sale such merchandise at prices lower than the current price as above defined, the inventory may be valued at such prices less direct cost of disposition, and the correctness of such prices will be determined by reference to the actual sales of the taxpayer for a reasonable period before and after the date of the inventory. Prices which vary materially from the actual prices so ascertained will not be accepted as reflecting the market."

How far such an item by item comparison can be carried out or, in many cases, appropriate replacement market prices found, remains an area of open conjecture and controversy. The writedowns involved in the use of this method are important only in years of sharply declining prices, such as 1930-32 and 1938. In view of the difficulty of making the relevant comparison for goods in process and finished goods in manufacturing inventories, serious questions may be raised with respect to the extent to which firms using the lower of cost or market method actually do write down the value of inventories. Thus, while replacement market pricing may not be ambiguous with respect to time, there is considerable ambiguity in the extent to which writedowns are made in practice. The lower of cost or market and the LIFO methods may not be used simultaneously for tax-reporting purposes.

The practice of valuing inventories at the lower of cost or market presents an interesting aspect of the general problem of inventory cost allocation. In reducing the value of the ending inventory to the replacement market price the accountant, in effect, reallocates the amount of the writedown to the cost of goods sold during the period and reduces the book profit of the current period. The rationale appears to stem from the notion that the revenue of one period should not be burdened with the excessive costs inherited (via the beginning inventory) from the preceding period. In other words (the argument seems to run), if book cost exceeds replacement cost the excess represents an operational blunder or misfortune, which should be charged to the current period rather than passed on to the succeeding period. The argument is, however, peculiarly one-sided. Elementary consistency would require that the accountant follow through in years when the concern has built up an inventory at low cost on a rising market (that is, when replacement cost exceeds actual cost) and take credit for the operational foresight or bonanza in the year in which it occurs instead of passing it on to the succeeding period. If the high cost of the beginning inventory constitutes an improper drain upon the revenues of the period that inherits it, why should a low-

cost beginning inventory not be viewed as imparting an improper gain? The shortcomings of the lower of cost or market procedure have been widely recognized in theoretical accounting articles,¹⁷ but the criticism seems not to have affected accounting practice much. It continues to be the valuation basis most extensively used.

In our estimates, for the purpose of the deflation procedure used to express book values in constant dollars, it has been assumed that all manufacturing industries,¹⁸ except beverage and tobacco, and all trade groups value their inventories at the lower of cost or market, and that all other inventories are valued on a straight cost basis. Both assumptions are based on what appears to be the predominant practice.

An additional element in this complex picture is that not only do concerns vary in their costing procedures, but an individual concern may evaluate the various segments of its total inventory on different bases. For example, a concern may use the last-in, first-out method for raw materials, the straight cost method for goods in process, and the lower of cost or market for finished goods. Indeed the coils of involvement do not end even here. If a manufacturer chooses, he may use the LIFO method not only for his raw materials inventory but also for the raw material elements of cost in his goods in process and finished goods inventories as well.¹⁹

This outline of costing procedures is not exhaustive, but serves to indicate the heterogeneous character of inventory costs relative to the periods to which they pertain. For this reason the book value of inventories should be interpreted as a first approximation to 'current value'. The closeness of the approximation depends in part upon the definition of 'current value'. The great majority of all inventory costs are current within the compass of one year. The problem of the "heterotemporality of prices" (to use Professor Kuznets' apt phrase)

¹⁷ See the succinct summary in *Accountants' Handbook*, pp. 560 ff.

¹⁸ An exception is made for LIFO inventories, a relatively minor proportion of the manufacturing inventory total; see note 14.

¹⁹ See *Supplement to Regulations 111*, Sec. 29.22 (d)-1.

diminishes rapidly as the base for current prices is increased from one day to one year.²⁰

In general, for reasons briefly indicated above, the book value of inventories tends to approximate the price levels prevailing in the latter half of each year, the particular period varying from industry to industry depending upon the rate of turnover in each. When prices are declining sharply, however, a substantial proportion of the total value of inventories in manufacturing and trade may be valued at 'market' prices prevailing at the year-end. For the three survey years considered, most inventories appear to be valued at cost, the writedowns to market under the lower of cost or market formula being of minor importance. Consequently, differences between cost and market valuations are probably a negligible factor in the comparability of the estimates.

In two noteworthy areas the cost prices reflected in the book value of inventories are not 'current', but may extend beyond a year. The first arises from the use of the LIFO method. As noted, the book value of LIFO inventories may be in terms of the prices of preceding years. While the method is used by business to only a minor degree, to that degree it makes the book value of the 1946 inventories somewhat lower than a strictly 'current' valuation would be, since the inventories of firms using the LIFO method reflect the lower prices of preceding years. There is no similar effect in the 1929 or 1939 data because the LIFO method was used little or not at all.

Products that undergo extensive aging periods as part of their normal production process form a second area in which the cost prices of goods in inventory may be in terms of prices of a preceding year or years. The two outstanding examples are alcoholic beverages and leaf tobacco, though aging periods are common to many other types of commodity of lesser importance in the inventory aggregate, such as seasoned lumber and

²⁰ In a year such as 1946 the variability of prices may be as great as the maximum range of fluctuations encountered in some periods of a decade or more. However, this problem is common to the valuations of all assets in the national balance sheet.

certain kinds of cheese. Tobacco and alcoholic beverages constitute the bulk of the inventories of two principal industries in the manufacturing group; according to *Statistics of Income for 1939*, the book value of inventories for corporate firms amounted to \$571 million in the tobacco industry and to \$296 million in the beverage industry. However, since the unique pricing problems the aging process entails are largely confined to these two industries, their inventories can be conveniently isolated or treated separately from all other inventories if this should prove necessary or desirable for certain types of wealth comparisons.

C STATISTICAL SOURCES

Partly because of the requirements of national income and product estimates and partly because of the character of the underlying data, the inventories of the corporate and noncorporate segments of the nonfarm business sector of the economy were estimated separately. The corporate inventory compilation is based upon data published annually in *Statistics of Income* (Part 2), which covers all corporations filing federal income tax returns. In view of the predominance of the corporate form of organization in terms of inventory holdings, *Statistics of Income* may be regarded as the mainstay of the estimates. Approximately four-fifths of total nonfarm business inventories are held by corporations (Table 3).²¹

The chief sources for the noncorporate inventory estimates are the various Censuses of Business and the special tabulations of the 1939 tax returns of sole proprietorships and part-

²¹ With respect to the geographic scope of the estimates, it may be pointed out that the corporate estimates include inventories held in (a) Hawaii and Alaska; (b) the United States by resident foreign corporations; and (c) foreign countries by branches of United States corporations. (Foreign branches are distinguished from foreign subsidiaries by the fact that the latter are incorporated abroad and therefore do not file tax returns with the U. S. Treasury Department.) There is no way of indicating the value of the inventories that may be involved in each case. To the extent that United States inventories held abroad are counted also in the estimates of total United States tangible assets abroad, there will be double-counting. These inventories, however, are relatively small. See estimates by Robert L. Sammons, below.

Table 3
Book Value of Nonfarm Business Inventories
by Legal Form of Organization, 1939
(millions of dollars)

	Total	Corp	Noncorp.	% Corp. are of Total
Total	22,144	17,999	4,145	81
Manufacturing & trade	20,298	16,389	3,909	81
Manufacturing	11,516	11,129	387	97
Trade	8,782	5,260	3,522	60
Wholesale	3,202	2,437	765	76
Retail	5,580	2,823	2,757	51
All other	1,846	1,610	236	87
Public utilities	723	723	...	100
Mining & quarrying	356	323	33	91
Finance, insurance, & real estate	45	45	...	100
Miscellaneous	722	519	203	72

nerships,²² which provided valuable benchmark inventory-sales ratios for each industry. For some years the noncorporate inventory data are available directly, notably in the case of wholesale trade for 1939 and retail trade for 1929.²³ In most cases, however, the noncorporate estimates had to be constructed from the raw materials in the sources. Noncorporate sales data and noncorporate inventory-sales ratios were cross-multiplied to yield the inventory estimates for each industry. Because of lack of data our estimates omit the fragmentary holdings of three noncorporate industrial groups: finance, insurance, and real estate; transportation; and communications and public utilities. Trade inventories constitute approximately 85 percent of the noncorporate total.

Neither the Census nor *Statistics of Income* covers the entire nonfarm business universe. The latter does not cover noncorporate enterprises, and the former presents inventory data for manufacturing and trade only. In both, however, the areas covered, though differing in scope, represent preponderant proportions of the total. Accordingly, the integration of the inventory data in the two sources presented the familiar statis-

²² *Statistics of Income for 1939*, Part 1, Table 8; *Supplement*, Part 1, Table 2.

²³ The Census data on noncorporate retail inventory for 1929 were adjusted for comparability with later Census data.

tical problem of adjusting for the omissions and duplications encountered whenever source materials are heterogeneous.

Since Census inventory data for entire industries (both corporate and noncorporate) exist, an explanation may be in order why these totals were not used directly for the industries to which they apply. The basic reason lies in the difference in industrial classification of the Census and of *Statistics of Income* due to the organizational unit on which the classifications are based. Census data are classified by 'establishment', a relatively small organizational unit, usually a single plant, factory, or place of business. *Statistics of Income* classifies corporate concerns on the basis of the one business activity that accounts for the largest percentage of total receipts. Since a corporate concern may have many establishments, the *Statistics of Income* classification makes for overlaps in some major industrial groups. It is therefore impossible to move freely from Census to *Statistics of Income* data for individual industry groups.

Unfortunately, few of the discrepancies due to the differences in classification can be compared in detail because the Census inventory data are not arranged by legal form of organization. Of the three major Census compilations for 1939 in which inventories are reported—manufacturing, wholesale trade, and retail trade—the wholesale trade inventory data alone are divided into corporate and noncorporate.²⁴ This division, however, gives a clue to a significant area of difference between the two series. The inventories of the corporate wholesale trade group for 1939 are reported in the Census volume as \$3,107 million; the corresponding figure from *Statistics of Income* is \$2,437 million.²⁵ The discrepancy is due mainly to the fact that large portions of the two wholesale trade subdivi-

²⁴ However, all three censuses present an allocation of *sales* by legal form of organization that was useful in constructing the noncorporate estimates.

²⁵ In *Statistics of Income* corporate trade is divided into three major groups: wholesale, retail, and trade not allocable. The wholesale inventory figure is \$2,203 million (after a minor adjustment for returns without balance sheets); the inventory in the trade not allocable group (after a similar minor adjustment) is \$505 million. Even an allocation of the latter that differed considerably from the one used would leave a significant area of difference between the two series.

sions, 'manufacturers' sales branches' and 'petroleum bulk tank stations', are classified with the parent corporations in the manufacturing industry group in *Statistics of Income*.

Comparison of Census and Bureau of Internal Revenue inventory data is further complicated by serious omissions from the former, some of which are noted in the prefaces to the Census volumes. The *1939 Census of Manufactures*, for example, points out: "Inventories owned by manufacturing concerns but held in warehouses separate from the manufacturing plants are not included." In consequence of this omission the Census inventory total for the tobacco industry is approximately \$390 million short of the corporate total in *Statistics of Income*. There is a discrepancy of a similar order of magnitude and in the same direction for the petroleum industry. Again it is impossible to make detailed comparisons because it is not known to what extent divergencies are due to undercoverage or to differences in classification. However, a comparative compilation of the 1939 inventories for all manufacturing and wholesale trade combined, based on Census data, yielded a total that was considerably lower (about \$1 billion, after adjustment for certain incomparabilities) than our estimated aggregate. The latter estimate was based upon *Statistics of Income* for the corporate sectors of manufacturing and wholesale trade, Census data for the noncorporate sector of wholesale trade, and an estimate of the noncorporate sector of manufacturing, constituting less than 5 percent of the total inventories held by all manufacturing concerns.

The integration of the inventory data from these two sources for 1929 was further complicated by two factors. First, the Census of Manufactures did not compile inventory data; second, corporations were at that time permitted to file consolidated returns for affiliated groups of companies. Some idea of the effect of consolidated reporting on the industrial distribution of inventories can be ascertained from *Statistics of Income for 1934*. In that year the privilege of filing consolidated returns was revoked and all corporations except railroads were required to file unconsolidated returns, which were classified

on the basis of the predominant business of each company.²⁶ Special cross-tabulations, however, make it possible to summarize the 1934 industrial distribution on both the consolidated and unconsolidated bases. The effect of the two methods of filing returns on the industrial distribution of inventories is shown in Table 4. Trade inventories in 1934 were approximately \$400 million less than they would have been had the consolidated basis been continued. In relating this type of shift to 1929, it should be recalled that the level of corporate inventories was about 50 percent higher than in 1934; consequently, the absolute differences in the industrial distribution occasioned by unconsolidated reporting would be correspondingly magnified.

Table 4
Year-end Corporate Inventories by Major Industry Group
Consolidated and Unconsolidated Bases, 1934
(millions of dollars)

	Consolidated ^b	Unconsolidated
Total ^a	14,606	14,595
Manufacturing & trade	12,830	12,950
Manufacturing	8,750	8,454
Trade	4,080	4,496
Mining & quarrying	443	407
Public utilities	736	636
Finance, insurance, & real estate	114	118
All other	483	484

Statistics of Income for 1934—'consolidated basis', computed according to method described on pages 20 and 27-9; 'unconsolidated basis', *ibid.*, Table 3.

^a The small difference in the grand totals is due to the different weights given to the raising ratios used to adjust for firms not reporting balance sheet data in each industry.

^b The 1934 tax returns are consolidated on the same basis as for 1933.

The foregoing considerations indicate that an estimate for 1929 obtained by adding *Statistics of Income* data for manufacturing (and for 1929 there is no alternative for this large segment of the total) to Census data for trade would significantly overstate the aggregate. An overstatement of this type is im-

²⁶ Although this requirement provided for a more selective industrial distribution than was possible for consolidated returns, it was still not a 'pure' industrial classification because of the diversified business activities of many of the unconsolidated corporations, as pointed out above.

plied in Professor Kuznets' estimates of manufacturing and trade inventories for 1929.²⁷

It is evident that considerable duplication is introduced by combining Bureau of Internal Revenue and Census data for 1929. The duplication stems from (a) the overlapping between manufacturing and wholesale trade indicated by the comparison of corporate wholesale trade inventories as reported by the Census and the Bureau of Internal Revenue for 1939, when corporate tax returns were classified on an unconsolidated basis; and (b) the additional amount of trade inventories included in manufacturing when returns were classified on a consolidated basis (see Table 4). These two comparisons could readily account for the difference between the two trade inventory estimates.²⁸

It was partly for the statistical considerations outlined above that inventories were estimated by legal form of organization. While *Statistics of Income* data have serious defects in the somewhat blurred industrial classification due to the use of companies as the unit of classification, the system is internally consistent and yields a more comprehensive (that is, all inclusive) aggregate. Internal consistency in the industrial classification is of prime importance not only in getting estimates relatively free from omissions and duplications for the manufacturing and trade groups, but also in connection

²⁷ See *National Income and Its Composition, 1919-1938* (NBER, 1941), pp. 904 and 907.

	Kuznets' estimates	Our estimates
	MILLIONS	
Manufacturing	\$13,920	\$13,251
Trade	12,372	11,401
Total	26,292	24,652

²⁸ The difference between the two manufacturing inventory estimates is attributable to variations in the noncorporate estimates. Kuznets' series is based on the assumption that the inventory-sales ratios are the same for both corporate and noncorporate manufacturing industries, whereas our estimates are based on the assumption that corporate and noncorporate inventory-sales ratios show the same year-to-year movement but are at considerably different levels, as evidenced by the 1939 tabulations of the tax returns of sole proprietors and partnerships by the Bureau of Internal Revenue. These tabulations were not available when Professor Kuznets made his estimates

with measuring the inventories of all other industries, for which no direct data are available in the Census compilations.

A second and equally compelling reason for using *Statistics of Income* corporate data in toto is that these, covering, as noted, about four-fifths of the nonfarm business total, are available annually, thereby affording a satisfactory basis for measuring year-to-year movements in the total.

A third reason stems from the unique relation between the inventory valuation adjustment and profits in national income. Clearly the inventories on which the valuation adjustment is calculated and the profits affected by this adjustment should pertain as nearly as possible to the same companies, both in total and by industry. Thus the use of *Statistics of Income* for estimating corporate profits virtually requires the use of the same source for inventories. An auxiliary advantage is that the corporate inventory division makes possible comparisons with other types of assets for the corporate sector. Asset data for the noncorporate sector are relatively few.

A final point: the *Statistics of Income* inventory data have an added merit in that their general basis of valuation conforms to the regulations specified in the Internal Revenue Code. Thus certain statistically troublesome practices not allowed by the Code, such as "deducting from the inventory a reserve for price changes, or an estimated depreciation in the value thereof" or "using a constant price or nominal value for so-called normal quantity of materials or goods in stock",²⁹ can be ruled out in evaluating the book value of inventories derived from this source.

D CONCLUSION

Estimates of the nonfarm business inventory component of national wealth are reasonably satisfactory except for undervaluation due to the exclusion of certain cost elements. We conclude with a brief note on the additional types of informa-

²⁹ *Regulations 111, Sec. 29.22 (c)*-1.

tion that would contribute to a solution of certain peripheral problems that arise in using and interpreting the book value of inventories.

First, in view of the relatively adequate information available for the predominant corporate sector, the principal problems in obtaining comprehensive estimates of the book value of business inventories relate to the availability of noncorporate data (particularly on noncorporate trade). Two suggestions may be made in this connection. (a) Estimating would be greatly facilitated if future Censuses classified inventories by legal form of organization. (b) Useful data on inventory-sales ratios might be obtained from periodic surveys of the income tax returns of sole proprietors and partnerships similar to the tabulations by the Bureau of Internal Revenue for 1939. (The Bureau plans to prepare such tabulations for the 1945 returns.)

Secondly, more information is needed on the scope of the assets included in the inventory account, especially with respect to goods in transit and the balance sheet classification of miscellaneous small assets such as replacement parts, small tools, dies, and patterns.

Thirdly, it would be very helpful to find out more about the extent to which indirect costs are included in the book valuation of inventories; inventory goods are actually written down to market under the lower of cost or market rule; and the various costing procedures such as FIFO, LIFO, average cost, specific identification, or other methods are used by businesses for tax-reporting purposes. Few of the sample surveys on this subject made during the last several years can be interpreted statistically because many of the costing procedures reported in use are not accepted by the Bureau of Internal Revenue for tax purposes and consequently have no bearing on the interpretation of *Statistics of Income* data; the results are stated in terms of the number of companies using each of several methods with no indication of the dollar value of the inventories so valued; and the results are not stratified by industry

and hence cannot be applied to industrially classified data.³⁰ It is realized that a sample survey on the 'quantitative importance' of the various inventory valuation methods in use would entail many difficulties, especially since most firms use different methods for the various segments of their inventories. However, even if it were necessary for the respondents to estimate the proportion of the total book value that is based on each method, the information would be far superior to the rather naked guesses of an outside estimator.

³⁰ See, for example, *Practices in Inventory Valuation*, National Industrial Conference Board, Feb. 1938; Survey by the National Association of Cost Accountants, *Bulletin*, Vol. 18; and the compilation by the research department of the American Institute of Accountants, *Journal of Accountancy*, Vol. 70.

Consumers' Tangible Assets

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A SCOPE AND CONCEPTS

Evaluating consumers' tangible assets other than land and residences calls for a rather liberal sprinkling of imagination and guesses on the basis of fragmentary information. The paucity of reliable data is no doubt the reason estimating the total value of consumers' capital at different dates and the part played by consumers' capital in business cycles has received so little attention. Changes in the value of this capital relative to changes in the value of other forms of tangible assets and of consumers' debts deserve intensive study. Information on stock of various goods in consumers' hands and on its age distribution at various dates would be useful in forecasting fluctuations in consumer demand.

The main purpose of this paper is to describe the nature of the data needed for more adequate estimates of consumers' tangible assets and to suggest techniques for their collection. First, however, we review some previous estimates and consider the character and limitations of the data. We then present some very tentative estimates of consumers' tangible assets for 1929, 1939, and 1946. Consumers' tangible assets can probably never be estimated with a high degree of precision, but substantial improvement is possible.

1 *Concepts*

Before we can evaluate the usefulness of existing data we must define our concepts explicitly. The value of goods owned by private individuals and families for personal use must be distinguished from the value of all consumer goods. Durability must be defined before proposals for collecting more data are considered, since the methods depend upon the nature of the data.

a *Ownership units*

In broad terms the household is the ownership unit. More specifically, the owning group is defined as the civilian, noninstitutional population, i.e., members of private families and

single persons living alone or as lodgers and servants in private households and in lodging houses, hotels, etc. The holdings of lodgers and servants are important chiefly in the case of more or less personal goods, since by definition they own few if any household goods. For the sake of brevity, the civilian noninstitutional population will be referred to as consumers.

Since persons living in institutions of various types and on military and naval posts are relatively few, except during wars, and their tangible assets are rather negligible on the average, their inclusion or exclusion is of minor importance. It would be desirable to exclude their assets when studying changes in the value of consumers' capital in relation to business cycles, since they would not change with fluctuations in economic conditions in the same manner as the holdings of the civilian noninstitutional population. If they are excluded, however, their value should be estimated in some manner and presented as a separate component in the national balance sheet.¹

Goods purchased and in the possession of consumers will be treated as owned by them even though they may not have title because of outstanding credit obligations. It would be impractical to do otherwise and it would be undesirable to try if the value of consumer goods is to be compared with outstanding consumer credit.

b *Consumers' tangible assets*

Consumers' tangible assets may be defined as consumer durable goods in accordance with Simon Kuznets' classification, i.e., commodities that, without marked change, are ordinarily employed in their ultimate use for three years or more. At the other extreme, consumers' tangible assets may be defined to include not only durables and semidurables but also the food

¹ It would be extremely difficult, though not impossible, to obtain directly from institutional residents the information requisite to evaluate their assets. When estimating national consumption for 1935-36, the National Resources Committee calculated roughly the disbursements of the institutional agencies themselves for the maintenance and care of residents, but did not include expenditures by the 2 million residents from their personal funds because information was lacking on the allocation of such funds.

on the pantry shelf, cleaning supplies, toilet preparations, the coal in the bin, the fuel oil in the tank, etc.

The former seems too narrow a definition for the purpose at hand. Semidurable goods, which Mr. Kuznets defines as ordinarily employed in their ultimate use for six months to three years, comprise a substantial total and should be included in consumers' wealth. Moreover, the demarcation between durable and semidurable goods, so defined, is often tenuous. Perishable commodities of the types illustrated above are easy to distinguish. Though many can be stored for long periods, they are more or less completely consumed when used.

We define consumers' tangible assets as goods that are ordinarily employed in their ultimate use for more than six months. Separate estimates of the value of durable and semidurable goods owned by consumers would be useful in studying changes in assets in different phases of business cycles, but their significance would be limited by the difficulty of classification.

The valuation of residences is outside the scope of this paper. Other tangible assets of consumers fall into seven broad groups:

- 1) Automobiles, which will be dealt with separately because of particular interest in their value and also because data available for their evaluation are more adequate than those available for the evaluation of other consumer goods.
- 2) Motorcycles, bicycles, and other wheelgoods, boats, and pleasure aircraft.
- 3) Household furniture, equipment, and furnishings (both durable and semidurable).
- 4) Radios, phonographs, musical instruments.
- 5) Clothing, personal accessories, footwear.
- 6) Jewelry, watches, clocks.
- 7) Other goods
 - a) Play and sports equipment not included under 2 and 4
 - b) Books and other durable printed matter
 - c) Luggage
 - d) Ophthalmic products and orthopedic appliances

- e) Writing equipment (durable)
- f) Tombstones and monuments
- g) Private collections of art, coins, stamps, etc.

Many of these goods—automobiles, housefurnishings and equipment, writing equipment, books, etc.—are owned and used by business establishments, governmental bodies, and institutions; moreover, the goods themselves are indistinguishable from those used by private individuals for personal living.

Similarly, many persons use their automobiles and certain other durable goods partly for business purposes. If the concept of ownership units is to be adhered to, the value of such goods must be apportioned between consumer and nonconsumer use. Indeed, if it is not, the national balance sheet will presumably contain duplicate entries, since the portion of the value of such goods chargeable to business should appear among the assets of farms, nonfarm entrepreneurs, and landlords.

A third point, in addition to degrees of durability and purpose, is the treatment of goods not in use. Commodities not in use but in usable condition (or in need of ordinary repair) may be deemed of little or no value by their owners, but they are certainly part of total consumers' stocks. They may later be used by their owners or could be used by others if given away or sold.

c *Value*

Any method of valuation will yield only an approximation to the 'true' value.² The capitalization method used for valuing certain wealth items is in general not practicable for consumers' stocks. Valuation at original cost—a common business practice and hence the basis for valuing much of business capital—is not appropriate if interest centers in the current value of the stock of consumer goods. Therefore, current market prices seem the most logical basis.

² See Simon Kuznets, 'On the Measurement of National Wealth', *Studies in Income and Wealth, Volume Two*, pp. 23-33, for discussions of alternative methods of valuation.

In one respect, consumer goods are less difficult to value at current prices than are producer durable goods; in another, more difficult. Since consumer durables generally have a shorter life than producers' equipment, the proportion of the total consumers' stock that passes through the market in a year exceeds that of producer goods, making it easier to determine a representative price. A bigger difficulty arises from the wide variations in the specific characteristics of many consumer goods and continuous style changes. This difficulty is avoided in part if the utility and general characteristics of the commodity rather than its exact physical characteristics are considered. In other words, prices for equivalent rather than identical consumer goods should be used.

The use of current prices of equivalent articles rather than prices at the time of purchase avoids a hybrid value composite made up of prices determined at many dates under varying circumstances. The problem is to select appropriate current prices for goods purchased earlier. For automobiles, the secondhand market is sufficiently active to yield reasonable average prices for automobiles of various ages.⁸ This is true of only a few other consumer durables, however, certainly not of commodities with a usual 'life' of merely a few years. For goods that cannot be priced in the secondhand market, the prices of equivalent new commodities, adjusted as well as possible for the consumption that has already taken place, must be substituted. Secondhand market prices are preferable because they take into account changes in the characteristics of the commodity.

Should the value of consumers' tangible assets represent the value in hand, so to speak, or their replacement value? In other words, should secondhand commodities be valued at the prices the owners would receive if they sold them or at prices the owners would have to pay to replace them? There are arguments in favor of both concepts. We favor replacement value.

⁸ Most secondhand cars pass through dealers' hands.

d The 'life' of consumer goods

One distinguishing characteristic of consumer durables is that their replacement is postponable.⁴ As is well known, automobile purchases, for example, were at a very low level during the early 'thirties but the number of cars in operation declined negligibly. Similarly, during the war automobile registrations remained remarkably close to the prewar level despite nearly three years without automobile production.⁵ A coat or a sofa is seldom used until it is completely worn out; its useful life, in other words, is social, economic, or psychological rather than physical. During depressions or at the beginning of a downswing, goods continue to be used that would be replaced if persons were optimistic about income prospects. Many commodities become obsolete because of style changes long before they are worn out. In good times, therefore, the replacement rate is high. True, goods that are replaced remain part of the national stock if they are traded in and bought by others, but in general the scrappage rate rises in prosperity.

What measure of life then is most appropriate for estimating the value of commodities in consumers' hands at any given date? There appear to be three alternatives: the actual physical life, as measured in testing laboratories; the number of years during which it is economically efficient to use such goods, i.e., before the cost of repairs and maintenance become excessive; or the customary period of use before scrapping. The third, in part a function of the general level of income, seems the most appropriate for the purpose at hand. When times are bad the total stock of most goods is smaller and their average age higher than when times are good, but their life span is also longer. Hence, the residual use value of consumers' tangible assets may not actually be so much less in bad than in good times as would appear if the life span of consumer goods were assumed to be the same at all stages of business cycles.

⁴ See E. B. George, 'Replacement Demand for Consumers' Durable Goods', *Journal of the American Statistical Association*, Vol. 34, No. 206, June 1939, pp. 239-60.

⁵ Reduction in use due to gasoline rationing helped to prolong the physical life of cars.

Improvements in technology in the last twenty or thirty years have greatly lengthened the physical life of automobiles and many modern household appliances. Even though style changes kept replacement rates relatively high, technological improvements resulted in a larger total stock of such goods (as persons in the lower income groups have found efficient and relatively cheap used models available for purchase) and a higher average age of those in use. Additional improvements and the introduction of new consumer goods will undoubtedly affect any measures of length of life, so that a frequent check will be required.

Except for passenger automobiles, there are no satisfactory data from which to estimate how long consumer goods are used.⁶ Estimates have been made by the Bureau of Internal Revenue for certain goods used by business establishments as well as in households, but there is every reason to believe that they are only roughly applicable when interest centers in the stock of such goods in the hands of consumers.⁷

A corollary to information on length of life in use is the rate at which goods depreciate, whether depreciation is constant or variable. Physical depreciation is generally less rapid during the early than the later part of the life of a durable, but the market value suggests that the reverse is true. Hence, there appears to be no alternative to an assumption of constant depreciation.

A subsidiary question is how long a commodity should be considered new. Ordinarily, a new commodity will not bring its cost price if resold within a few days of purchase. Since this markdown does not reflect true depreciation, we recommend valuing a commodity as new for the period during which the owner would consider a replacement equivalent in value only

⁶ Solomon Fabricant, in his *Capital Consumption and Adjustment* (NBER, 1938), included the consumption of only the part of consumers' capital represented by houses and automobiles on the ground that "Owing to the unsatisfactory character of the data no attempt was made to estimate depreciation on furniture or other durable goods" (p. 139).

⁷ Bulletin F (revised Jan. 1942), *Income Tax Depreciation and Obsolescence—Estimated Useful Lives and Depreciation Rates*.

if it were new. Again, therefore, an approximation must serve when valuing consumer goods.

2 *Type of Data Needed*

In essence, the requirements for estimating the value of consumers' tangible assets are three: a physical inventory of each good, i.e., the number owned and their age distribution; current prices of new goods, and, for those for which the second-hand market is reasonably active, current prices of goods of different ages; and the life span of each good. The total value is then the sum of the products of the number of commodities of various ages and the appropriate prices. Obviously, it is impracticable to make a comprehensive physical inventory of consumer goods, then to price all items, particularly those with a relatively short useful life. To evaluate such goods, information on expenditures during an appropriate number of years (converted to current price levels) must be substituted for physical inventory and item price data.

Since any estimate of life span is an average, there are always older commodities in use. The scrap value of such 'over-age' goods should of course be included when evaluating consumers' tangible assets. While it may be difficult to estimate scrap value, it is practicable to include it for goods inventoried and priced (assuming other prices are not obtained for 'over-age' goods), but not for goods evaluated by cumulating expenditures.

Inventory data should be obtained directly from families and single persons, the group whose capital we wish to measure. Expenditure data may be obtained either for consumers or for the nation as a whole, and for the business, governmental, and institutional sectors of the economy. It seems logical to adopt the direct approach whenever possible; if the other method is adopted, the consumers' share is obtained by subtracting the expenditures of these three sectors from the total for the nation. Price data may be collected from retail outlets or from consumers. There are arguments in favor of each method.

Figures on average life in use can be built up from con-

sumers' reports on the age of goods owned and the frequency of replacement. In Section C the methods of obtaining the data needed for evaluating consumers' tangible assets are discussed. These summary comments are designed to indicate the viewpoint from which previous estimates and presently available data are appraised.

B EVALUATION

Kenneth E. Boulding recently contended that he knew "of no attempt to estimate the total value of consumers' capital".⁸ This was of course an exaggeration, since estimates of the value of consumer goods as a component of national wealth have been made for various dates back to 1850. In general, however, less effort appears to have gone into its estimation than into the estimation of many other components, perhaps because of the obvious inadequacies of the data.

Broadly speaking, data used to evaluate consumers' tangible assets have been of three types: information on the flow of consumer commodities with assumed periods of usefulness and depreciation rates; questionnaires on the value of household goods, apparel, etc.; and in the case of passenger automobiles, information on the number of cars in operation, prices, and depreciation rates. Theoretically, personal property tax returns are a fourth source of information, but they have never been used as a basis of estimation, presumably because only some states levy such taxes and because methods of appraisal vary widely.⁹

1 *Methods and Limitations of Previous Estimates for Goods Other than Automobiles*

Since the early estimates are rough guesses at best,¹⁰ to consider their derivation would contribute little to problems of

⁸ 'The Consumption Concept in Economic Theory', *American Economic Review*, XXXV, 2, May 1945, p. 8.

⁹ For a discussion of the general problem of using taxation data to evaluate wealth, see Kuznets, *Studies in Income and Wealth*, Vol. Two, pp. 34-5.

¹⁰ W. I. King, *Wealth and Income of the People of the United States* (Macmillan, 1915), p. 47.

estimation. What is striking and disturbing is the slight advance in methodology in this area in the last 50 or 60 years. Table 1 brings together various estimates for selected dates, 1922-38.

Table 1
Various Estimates of the Values of Consumers' Tangible Assets
Selected Years, December 31, 1922-1938
(millions of dollars)

Source	1922	1925	1929	1930	1935	1938
CONSUMERS' TANGIBLE ASSETS OTHER THAN AUTOMOBILES						
Census	89,816	...	...	...	...	...
NICB	(Census)	47,899	56,857	44,315	30,778	...
Keller	(Census)	46,789	52,990	52,187	...	...
Ingalls	...	...	48,000	...	...	...
Doane	(Census)	...	...	59,000	...	39,488
NRPB	...	...	...	...	37,886	...
PASSENGER AUTOMOBILES						
Census	3,942	...	...	...	...	...
Keller	4,239	6,292	7,763	6,988	...	...
Doane	...	...	...	...	...	4,707*
NRPB	...	...	...	...	8,308	...
ALL MOTOR VEHICLES						
Census	4,567	...	...	...	...	...
NICB	4,794	6,674	7,643	6,921	4,540	...
Ingalls	...	...	5,800	...	...	...
Doane	(Census)	...	...	6,000	...	5,988*

For a summary of methods and specific references, see the text.

* Estimate by the Automobile Manufacturers Association for the year ended December 31, 1937.

a Census estimates, 1922 and earlier

The 1880 and 1890 Census estimates of the value of household goods, clothing, etc. were based on estimates of the average value of such goods owned per family. In the Census of 1880 the average value was estimated "as thoughtfully as possible", and the aggregate checked by estimating the total value of such goods from data on production and imports, an average life in use having been assigned to the goods of each class. Allowance was made also for the average quantity of food, fuel, and other supplies on hand for domestic use.¹¹ The Census of 1890 used in part the findings of a survey of insurance policies on the

¹¹ 10th Census, 1880: *Report on Valuation, Taxation and Public Indebtedness*, p. 11.

contents of houses outside large cities. To the average value of insured furniture was added an average amount estimated to represent the value of carriages and mechanics' tools.¹² For 1900, 1904, and 1912 the Census Bureau relied on data on expenditures as measured by the value of manufactures and imports adjusted to allow for the cost of distribution and on assumptions concerning the average life of such goods.¹³

In essence, the latter has remained the technique except in the 1922 Census. While data on consumers' expenditures have been vastly improved, information on the life of consumer goods is still fragmentary and rough. For 1922 the Census Bureau built up an estimate of the value of consumers' tangible assets (other than automobiles, which were listed separately for the first time) in large part from answers to questionnaires sent to a sample of individuals throughout the United States.¹⁴

The 1922 survey was the first and last of its kind, but the results served as a base point in three series of estimates of the national wealth published subsequently. The consumer sample approach seems highly desirable if interest attaches to a separate valuation of consumers' holdings. It is not clear, however, whether the Census Bureau chose the method for that reason, since it added to the expanded sample estimates the estimated value of horse-drawn vehicles and of books in public libraries, or whether it considered the holdings of consumer goods by business, government, and institutions of negligible value.

The Census estimate for 1922, aside from any bias due to the sampling design and the technique for projecting the sample returns (about 37,000 returns out of 100,000) to a national basis, had two serious limitations. As noted above, a mail questionnaire was used; it asked for the "total fair value of household equipment and wearing apparel, including furniture,

¹² 11th Census, 1890: *Report on Wealth, Debt and Taxation*, Part II, Valuation and Taxation (1895), p. 8.

¹³ *Wealth, Debt and Taxation, 1913* (1915), pp. 19-20.

¹⁴ *Wealth, Public Debt and Taxation: 1922, Estimated National Wealth* (1924), pp. 15-6.

books, pictures, musical instruments, silver plate, dishes, kitchen and bedroom furnishings, trunks, clothing, watches, jewelry, etc.". Experience with field surveys of family incomes and expenditures has clearly demonstrated that most persons cannot even roughly estimate the total expense during a year for a particular broad category of goods and many will not attempt to do so, although they usually can and will give (in response to specific questions) the details necessary to build up such a total. Obviously, it would be much more difficult for the average person to estimate the value of all the clothing he owns, for example, than to estimate the amount he spent on clothing during the preceding year. Even if the respondent were willing and able to make an over-all estimate, however, there would be no assurance that he had included all the commodities assumed to be covered and no indication of how he valued them.

If subsequent surveys were conducted by personal interview rather than mail questionnaire, and a very detailed schedule used, the inclusion of all goods might be assured. This would not, however, solve the problem of valuation that results from the typical consumer's lack of knowledge about prices or values.¹⁵ Regardless of the interviewer's instructions, some respondents would probably report original price, others the original price adjusted by some very personal notion of depreciation, and still others the current price they would have to pay to replace the goods. Many would probably be unable to give any estimate of the value of certain commodities. At best, a hybrid value aggregate would be the result, with consequent ambiguity concerning its meaning.

b Two projections of the 1922 estimate

The National Industrial Conference Board built up a series of estimates of "stocks of goods in the hands of consumers" for

¹⁵ The Federal Trade Commission, in *National Wealth and Income*, published in 1926, offered no revision of the Census estimates for 1922. However, it suggested (p. 49) that the figure on chattels was probably too close to costs, i.e., depreciation was not fully allowed for.

1922-37 by applying to the 1922 Census estimate an index of changes in production, exports, and imports of a large number of articles of personal consumption.¹⁶

Keller projected from the 1922 Census figure estimates for each subsequent year through 1933 by a slightly different method.¹⁷ From the value of consumers' household goods, wearing apparel, etc., as shown by the Biennial Census of Manufactures for each Census year, he estimated the wholesale value of production for intercensal years by linear interpolation. A 33.3 percent mark-up was added to wholesale value to determine retail value. To estimate the net value of 'chattel' goods for a given year, he added the retail value of that year's output to the preceding year's stock and subtracted 20 percent of the value of that stock as a depreciation allowance.

Keller not only did not adjust for changes in business inventories, which he justifies by the absence of satisfactory data, but took no account of changes in imports and exports. Furthermore, he did not adjust for changes in the prices of goods comprising each year's inventory: consequently, the aggregate values for each year are a composite of prices that apply to different dates.

c *Ingalls' guess for 1929*

In his *Wealth and Income of the American People*, W. R. Ingalls attempted to estimate the national wealth in 1916 and 1920 in 1913 dollars. In 1931 he contrasted various estimates for later years and proposed to examine "the accounting in more detail, even if some of the important entries can be made only as intelligent guesses, to forget all about 1913 values, to reckon only in present terms, and to evade physical enumeration except in fragmentary ways".¹⁸ In the case of chattels,

¹⁶ 'New Estimates of the National Wealth and of Its State Distribution, 1922-1937', by R. P. Falkner, *Economic Record*, I, 11 (Oct. 5, 1939), pp. 120, 131.

¹⁷ *A Study of the Physical Assets, Sometimes Called Wealth, of the United States, 1922-1933* (University of Notre Dame, 1939), p. 137.

¹⁸ 'Wealth of the American People in 1929—Values in Current Dollars', *The Annalist*, Vol. 38, No. 979, Oct. 23, 1931, pp. 667-8, 702.

"meaning furniture, musical instruments, clothing, jewelry, private libraries and personal effects generally", he maintained that there could be no real accounting. He noted that at the same rate per capita as reported by the Census for 1922, their aggregate value would have been about \$44 billion in 1929. On the assumption that the per capita value had increased—"the people had more new things, radios, electric refrigerators, etc."—he guessed that the value in 1929 was \$48 billion, pointing out as confirmation that the Chamber of Commerce estimated \$49.6 billion for 1930.

d *Doane's two estimates*

In his *Measurement of American Wealth*, R. R. Doane presented a series of estimates of the value of chattels (including automobiles), for decennial dates 1860-1900, for 1904, and annually 1909-32, without explaining his method but merely acknowledging data from the Bureau of the Census, the Census of Manufactures, estimates of the United States Chamber of Commerce, and various trade journal studies.¹⁹ His figure for 1921 is identical with the 1922 Census estimate of the value of consumers' tangible assets exclusive of automobiles; his 1922 estimate is nearly \$3 billion smaller than the Census total.

In a later volume, *The Anatomy of American Wealth*, Doane based his estimates of the value of chattel goods other than automobiles in the possession of individuals in 1930 and 1938 on the 1922 Census figure.²⁰ He assumed that the per capita value of clothing was the same in 1930 as in 1922 and that the value of housefurnishings increased in the same proportion as that of new residential building. This yielded an estimate of \$59 billion for chattel goods in 1930. For 1938 Doane used a different method, "due to the unprecedented situation existing between 1930 and 1938". First he divided the 1922 Census aggregate for chattel goods between clothing and personal articles, on the one hand, and furniture, etc., on the other, in accordance with the Census allocation for 1912.

¹⁹ (Harper, 1933), pp. 10-1, 208.

²⁰ (Harper, 1940), pp. 238 and 256-7.

Then he applied indexes of changes in annual consumers' purchases of these goods (extrapolating NBER data) to the estimated per capita holdings of each class of such goods in 1922. From per capita holdings, so estimated, he arrived at \$39.5 billion for chattel goods other than automobiles in 1938. This procedure yielded an estimate for 1930 of \$54.6 billion including the value of passenger cars; the estimate he presented as his best approximation, excluding cars, was \$59 billion.

e NRPB estimate for 1935

The National Resources Planning Board estimated the value of personal property as a component of national wealth in 1935 by cumulating expenditures for a period of years.²¹ Its estimate was based on the annual data on commodity flow in Kuznets' *Commodity Flow and Capital Formation*, with assumed rates of depreciation, and adjusted for price movements. In the case of consumer durable goods other than automobiles, a constant annual rate of depreciation, 10 percent, was assumed. Thus, the value in 1935 was estimated by computing 10 percent of the 1926 value, 20 percent of the 1927 value, etc., adjusting these values to 1935 prices and adding the adjusted values, yielding \$20.8 billion for 1935 in 1935 prices. For consumer semidurable goods (exclusive of dry goods and notions which Kuznets includes), cumulative survival rates were assumed: 30 percent of value lost (the report says "remains") after the first year, 50, 70, 90, and 100 percent after the second, third, fourth, and fifth years. This yielded \$17.1 billion, or an estimate of \$37.9 billion for consumer goods other than automobiles. The difference between it and the NICB estimate, \$30.8 billion, reflects in part the fact that, by the nature of the source material, the NRPB estimate includes holdings of consumer goods by business, government, and private institutions, as well as households, while the NICB figures, extrapolated from the Census estimate, more nearly represent the holdings of consumers as defined in this paper. The inclusion of replace-

²¹ *The Structure of the American Economy* (National Resources Committee, 1939), Part I, Basic Characteristics, p. 376.

ment tires and tubes and automobile parts and accessories among semidurable commodities in Kuznets' series also contributed to the difference.

f *Household equipment on farms*

The sole estimate of consumer durable goods for one segment of the population is the valuation of household furnishings and equipment on farms, prepared as part of the consolidated balance sheet of agriculture for each year since 1940.²² The basic data were taken from two nationwide studies which furnished information on farm family expenditures in 1935-36 and 1941. The expenditure figures were projected with some adjustments by means of the Department of Commerce estimates of retail sales of various types of goods. On average annual expenditures 1936-40, taken to represent annual replacement or the amount necessary to maintain inventories at the level of that period, an inventory of furnishings and equipment in the possession of farm families during the period was estimated. Multiplying the average annual expenditures by the estimated number of years in use gave the inventory value on January 1, 1940; inventory values in subsequent years were estimated by adding expenditures, deducting depreciation (average 7 percent) on the preceding year's inventory, then adjusting for changes in the farm population.²³ The estimate overstates the value of household furnishings and equipment on farms in 1936-40 (and hence in subsequent years) because of the implicit assumption that holdings of goods bought earlier had not depreciated, i.e., that their unit value in the current year was the same as at the time of their purchase (in average 1936-40 prices). Failure to adjust each year's inventory to the prices of the next year, when estimating holdings for 1941 and later years, means that the estimates are subject

²² Bureau of Agricultural Economics, Miscellaneous Publications: No. 567, *Impact of the War on the Financial Structure of Agriculture*, pp. 66-7 and 183-5, and No. 583, *The Balance Sheet of Agriculture, 1945*, p. 24.

²³ Population adjustments were required because aggregate farm family expenditures were extrapolated by national sales estimates.

to the same limitation as Keller's figures. At the same time, because of the sharp increases in prices after 1941, this served to counterbalance somewhat the overstatement of the war period inventories that would otherwise have resulted from the method of computing the base period inventory. Limitations due to the use of the sample survey data are discussed below.

2 *Methods of Previous Estimates for Automobiles*

The value of motor vehicles as a separate category of national wealth was first presented in 1922. No attempt was made to value separately passenger automobiles owned by consumers for personal use. However, in this as in most subsequent estimates of the value of motor vehicles, the general methodology is of interest because it approximates what we propose for evaluating consumer durable goods.

The Census based its estimate for 1922 on reported output during a period covering the estimated average life of automobiles, trucks, motorcycles, and trailers, and on statistics of registration, with allowance for depreciation, valued in terms of prices prevailing in 1922.²⁴ For passenger cars, for example, the average life was assumed to be seven years; hence cars that went into service in 1916 were regarded as out of use at the close of 1922, having lost one-seventh of their value each year. Those that went into use in 1915 were assigned a junk value of \$25. On this basis, the number of cars available for use on December 31, 1922 was calculated to be equivalent to slightly more than 5 million new cars. The average price for new cars in 1922 was estimated to be \$770, yielding a total value of \$3,942,026,000 for passenger automobiles. For all motor vehicles, the estimated value was \$4,567,407,000.

In the NICB estimates of wealth for 1922 the value of motor vehicles is a separate component, but passenger cars are combined with other vehicles.²⁵ The method is not outlined in detail, but apparently depreciated original cost rather than current price with allowance for depreciation was used: "From

²⁴ *Estimated National Wealth*, p. 11.

²⁵ *Op. cit.*, pp. 120 and 130.

registration figures the number of vehicles in use was obtained; from production and mortality figures, the number of each age in each year; from the original price of each year's product and the amount of depreciation, the value of cars of each age in each year was determined, and the sum of the latter gave the total value of all cars in use." For 1922 the NICB estimate is slightly higher than the Census.

Keller presents in detail his procedure of estimating the value of passenger cars, which he treats as a separate category, for 1922-33.²⁶ Apparently very similar to that of the NICB, it likewise uses depreciated original cost. From American Petroleum Institute figures on the percentages of cars surviving each year Keller estimated the number of cars surviving in any given year. He applied its annual depreciation rates to the average retail price for each year to determine the average value in any given year of cars sold in preceding years. To get the average retail value of new cars in each year, he applied a standard 33.3 percent markup to the average wholesale value, calculated by dividing the value of product minus the value of exports by the total number of factory sales minus exports. These computations also yielded an aggregate slightly higher than the Census estimate for passenger automobiles for 1922.

Ingalls assumed an average price of \$200 per registration at the end of 1929—26,500,000, of which about 3,500,000 were trucks—and so derived \$5,300 million which, he comments, "is not unreasonable".²⁷ He cites in confirmation an estimate of \$5,461 million for all motor vehicles in 1930 prepared by a committee of the American Automobile Association.

Doane, in his first study, did not estimate the value of passenger cars or of all motor vehicles separately. In the second, he derived a total for 1930 by applying an average value of \$300 per car (derivation not explained) to the number of cars registered; for 1938 he took over an estimate of aggregate value prepared by the Automobile Manufacturers Association.²⁸

The National Resources Planning Board used the same

²⁶ Op. cit., p. 185.

²⁷ Op. cit., p. 668.

²⁸ *The Anatomy of American Wealth*, pp. 235 and 256.

method for estimating the value of passenger cars as for estimating the value of other consumer goods in 1935, i.e., cumulated annual expenditures, adjusted for price changes, with an assumed life of eight years.

3 *Description and Appraisal of Data Available for Evaluating Consumers' Tangible Assets*

None of the wealth estimators, least of all the Census whose 1922 survey served as the base for most subsequent estimates of consumers' tangible assets, claims any great merit or high degree of reliability for its estimates. There has been a serious dearth of reliable data with which to estimate the value of consumer goods other than automobiles and a notable lack of clarity in concept concerning the holders to be covered. Because of the inadequacy of data, greater clarity of concept would probably not have yielded much better estimates. The 1922 estimate (and by implication those extrapolated from it) would have applied to consumers' holdings had the value of books in public libraries not been added to the expanded survey aggregate and the value of horse-drawn vehicles been allocated between consumer and nonconsumer use. Only in the estimate of household furnishings and equipment on farms, which has other deficiencies, is the ownership unit clearly defined. Estimates of the value of automobiles (or all motor vehicles), which are more reliable, were intended to cover all in operation, not just those for personal use.

The present fund of information with which to evaluate the stock of consumer goods is considerably larger than that at the disposal of previous wealth estimators, but serious gaps remain, and some of the relatively new materials are limited in their applicability. On the side of information relating strictly to the civilian noninstitutional population, there are the findings of two nationwide surveys of family expenditures—the Consumer Purchases Study covering 1935-36 and the Survey of Family Spending and Saving in Wartime covering 1941 and the first three months of 1942—used in estimating the value of farm housefurnishings. Revised annual estimates of per-

sonal consumption expenditures by subgroups for 1929-46 were published by the Department of Commerce as part of the general revision of statistics on national income and national product.²⁹

a *Basic data*

Materials on a nationwide basis (covering both urban and rural areas) from these and certain other sources are outlined below. Those yielded by the 1941 and 1935-36 surveys are not in every case available in the form described, but they could be developed by reworking the basic data.

SOURCE	OWNERSHIP UNIT	ITEM DESCRIPTION & DATE TO WHICH DATA APPLY
I N V E N T O R Y D A T A		
Family Surveys by Departments of Labor & of Agriculture	Civilian noninstitutional population*	Autos. No. owned by age, Dec. 1941
		Autos: No. owned, June 1936
		Piano, radio, phonograph, electric refrigerator, other mechanical refrigerator, ice box, pressure cooker, power washing machine, other washing machine, ironing machine, vacuum cleaner, electric sewing machine, other sewing machine: No. owning, ^b Dec. 1941 & June 1936
		Radio-phonograph, gas kitchen stove, electric kitchen stove, toaster, iron: No. owning, Dec. 1941
		Selected items of clothing (outerwear) & footwear: No. owned, Dec. 1941
Title Registration compiled by R. L. Polk & Co.	All operators of passenger cars	Autos. No. reg. by age, an. 1935-41, 1944, 1946
U.S. Public Roads Administration & Automobile Manufacturers Association	(Same)	Autos: Total registered an. since 1895
Census & Automobile Manufacturers Association	(Same)	Autos: Annual output, factory sales, & retail sales
Census	All households	Radios: No. owning, 1940*

²⁹ *Survey of Current Business*, Supplement, July 1947; the series first appeared in the April 1942 issue.

SOURCE	OWNERSHIP UNIT	ITEM DESCRIPTION & DATE TO WHICH DATA APPLY
E X P E N D I T U R E D A T A		
Family Surveys by Departments of Labor & of Agriculture	Civilian noninstitutional population ^a	Commodities, with detailed item classification, at cost to consumers, 1941 & 1935-36
Department of Commerce	Consumers	Commodities by subgroups at cost to consumers, an. 1929-46
Simon Kuznets, National Bureau of Economic Research	Consumers & large ultimate consuming units	Commodities, by subgroups at wholesale prices; by 3 classes of durability, at cost to consumers, an. 1919-33
P R I C E D A T A		
Family Surveys by Departments of Labor & of Agriculture	Civilian noninstitutional population ^a	Autos: Av. price by model year, 1941; av. price for new cars & for all used cars combined, 1935-36
		Household furniture & equipment, by item. Av price for new & for all secondhand combined, 1941 (trade-in allowances, if any, deducted)
		Clothing, by item: Av. prices, 1941 & 1935-36 ^d
Automobile Manufacturers Association		Autos: Av. price new, lowest priced 4-door, 5-passenger sedan, an. 1925-40
National Association of Automobile Dealers		Autos: Av. price secondhand cars by model year, an. 1934-41

^a Most of the information on holdings in June 1936 and on expenditures and prices paid during 1935-36 is for families of two or more persons, whereas the data from the later study are for single persons as well as families.

^b For 1941, schedule provides information on number of radios owned.

^c Similar information on number having refrigerators, by type, and heating equipment is not listed since the enumeration covered all households; in many cases the equipment in rented units is owned by the landlord, not the occupant. It is assumed that radios are owned by occupants. Estimates are available also from trade sources of the number of houses equipped with electric refrigeration, washing machines, etc.

^d Usable on the assumption that substantially all clothing is purchased at retail, new.

Information on the age distribution of goods in use is still lacking except in the case of automobiles, and even for automobiles it is available for consumers as distinguished from all automobile users for only one year, 1941. The 1941 and 1935-36 surveys furnish information on the proportion of families and

single persons buying various commodities during a year, but this yields merely a very rough measure of the frequency of replacement, as some purchases, especially of durable equipment, are first purchases.

The inventory data from the 1941 and 1935-36 surveys, of considerable interest in themselves, show that it is feasible to collect such information from families (see Table 2 for a summary of findings on selected items). As they were not collected with wealth estimates in mind, however, they do not give sufficient information on the age of commodities owned to be used for estimating the value of stocks even for the survey dates. At present, therefore, to approximate the value of stocks of

Table 2
Estimated Number of Families and Single Persons Owning
Selected Items of Household Equipment at the End of 1941
(thousands)

Item	All types of community	Urban	Rural
Refrigerator, electric	16,985	11,684	5,301
other mechanical	1,117	786	331
ice	8,462	4,905	3,557
Kitchen stove, electric	3,562	2,033	1,529
gas	14,261	12,334	1,927
Washing machine, power	18,524	11,253	7,271
other	656	218	438
Ironing machine	1,985	1,686	299
Vacuum cleaner, electric & hand	16,926	12,577	4,349
Sewing machine, electric	5,588	4,435	1,153
other	17,120	8,066	9,054
Electric toaster	18,989	14,445	4,544
Electric iron	28,999	20,640	8,359
Electric mixer, juicer, whipper	5,751	4,221	1,530
Pressure cooker for canning	3,197	1,054	2,143
Piano	9,179	5,565	3,614

Estimates based on data from the survey of Spending and Saving in Wartime, conducted by the Department of Labor, Bureau of Labor Statistics, and the Department of Agriculture, Bureau of Home Economics. The number owning household equipment of the types listed is approximately equivalent to the number owned by consumers. In addition to those owned, many families (mostly in cities) had the use of stoves and refrigerators provided by the landlord and covered in the rent; in thousands they numbered: electric refrigerators, 2,145; other mechanical refrigerators, 478; ice refrigerators, 456; electric kitchen stove, 186; gas kitchen stove, 4,027.

goods other than automobiles in the hands of consumers it is necessary to rely on expenditure data.

Should chief reliance be placed on the survey data or on the Department of Commerce series? Each set has certain limitations and certain advantages, but on balance it appears that at present better estimates can be developed from the Department of Commerce data than from expanded survey aggregates. We shall consider briefly the limitations of the former and in greater detail those of the latter.

b Department of Commerce series on expenditures

There is no doubt that the annual data now available on consumers' expenditures, or commodity flow to consumers at cost to them, are a much better basis for estimating consumers' tangible assets than were the rough statistics on production, imports, and exports used by earlier students of national wealth. However, many problems remain, even with the refinements in commodity flow data introduced by Mr. Kuznets and the Department of Commerce after intensive study of changes in inventories, transportation charges, wholesale and retail markups, and the distribution of sales, and the information now collected on retail sales.

The first problem is the division of expenditures on consumer goods between consumer and nonconsumer purchases. In his estimates of commodity flow for 1919-33, Mr. Kuznets did not attempt such an allocation, except in the case of replacement tires, tubes, and automobile parts and accessories, arguing that in the absence of a reliable basis for allocation it is better to classify goods by preponderant use. Thus, he included with consumer durables some goods used by business, and with producer durables certain items used in the household or personally. This, he pointed out, probably caused a slight overestimate of the total value of consumer goods. For specific subgroups, however, the error may be in either direction. More serious, when estimating the value of tangible assets of consumers as defined in this paper, is the fact that Mr. Kuz-

nets defined consumers to include hospitals, charitable institutions, and hotels as well as households.³⁰

The Department of Commerce series on personal consumption expenditures, on the contrary, is defined to exclude purchases by business and government. Expenditures by nonprofit institutions, used to measure their services, are shown as a separate component of total personal consumption expenditures. By definition, therefore, their expenditures for specific commodities are excluded from the expenditure series for those commodities. Purchases by military personnel and institutional inmates through regular trade channels are included; for the period since 1939, purchases of clothing, jewelry, food, and toilet articles, by military personnel in post exchanges are also included.

Commodities were allocated between purchases by individuals and households (consumers, by our definition), on the one hand, and purchases by business, government, and institutions (nonconsumers), on the other, by two means: for some commodities, estimates for 1929-39 were based on Census data on the distribution of sales by manufacturers and by wholesalers among different classes of purchasers; for other commodities, direct estimates—or guesses—were made of the magnitude of purchases by specific types of user, either because there was an obvious source of such information or because Census data could not be applied to the specific products. Admittedly, such allocations were rough. Moreover, for many commodities for which nonconsumer use was assumed to be relatively small, no division between consumer and nonconsumer purchases was attempted. Allocations on the basis of Census sales data are also subject to question. In the first place, there is considerable

³⁰ See *Commodity Flow and Capital Formation*, p. 14, and also discussion in *Studies in Income and Wealth, Volume Three*, p. 388. In his *National Product since 1869* Mr. Kuznets presents estimates of the flow of commodities to consumers adjusted for business use of passenger cars. In the case of consumer durables the adjustment—a 30 percent allocation to the producer durable category, following the Department of Commerce procedure—was considerable, aggregating \$0.9-1.1 billion in each year 1923-29 or roughly one-eighth of the adjusted total at cost to consumers.

doubt concerning the reliability of some of the sales distribution reports. More serious is the fact that it was necessary to use reports on industry sales by manufacturers and line of trade sales by wholesalers to allocate specific products. For the years since 1939 the consumption expenditure series were extrapolated by retail sales data, with some adjustments for larger purchases for business use during the war years, notably of automobiles.

A second limitation to the use of Department of Commerce data, for 1940-46, to estimate consumer wealth arises from this method of extending the series. While the division by commodities for earlier years is believed fairly reliable, retail trade data are not adapted to yield a commodity breakdown. Use of such data for extrapolation is unsatisfactory for a period when the classes of goods handled by many outlets, especially those that sold durable household goods in prewar years, changed substantially. While there was a reasonable check on the estimates of total consumption expenditure for these years, there was no control over the component group estimates.

A third limitation is the classification system for the recently revised series.³¹ Expenditures on perishable and semidurable goods are not presented separately as they are in the preliminary series of estimates. This is unfortunate since we wish to include the value of semidurables in consumers' capital; the value of certain toilet articles, for example, which have a fairly long life, cannot be included because expenditures for them are combined with those for toilet preparations and less durable toilet articles. The combination into subgroups of durable commodities with widely different periods of usefulness is another aspect of the classification problem. Another defect, from our point of view, is the inclusion, in the appropriate commodity series, of landlords' expenditures on furniture, stoves and ranges, and refrigerators for rental dwellings. In other words, space rent is defined to exclude furniture and equip-

³¹ Obviously no system of classification can be precise or serve all purposes. This is a criticism of the Department of Commerce series only with respect to its usefulness for our purpose.

ment that are covered by the rental rate, and purchases of such products by landlords are included with purchases by householders for their own use. Because of the growing tendency to provide stoves and refrigerators in rental units, this is more serious when estimating the value of consumers' holdings for recent than for earlier years; the number of furnished units offered for rent increased considerably during the war. Expenditures for furnaces and other installed heating facilities, window screens, shades, etc., on the other hand, are included in space rent even though the facility or fixture belongs to the occupant.⁸²

A final problem—of minor importance—is the crudity of the estimates designed to cover secondhand purchases, expenditures for which are included in the value of consumers' stocks. To avoid duplication the Department of Commerce records dealers' margins (the excess of consumers' purchases from secondhand dealers over sales to secondhand dealers) since expenditures for new goods are reported at the full retail price before trade-in allowance. In family surveys, on the contrary, it has been customary to record net rather than gross prices for goods when a trade-in is allowed. Total expenditures for new and used commodities together are thus the same, conceptually, as in the Department of Commerce series, but are probably more precise because expenditures are recorded in the same manner for secondhand goods as for new.

c Family survey data

The limitations to the use of the family survey data are of two types: those of general application and those peculiar to the two nationwide studies. First, any sample survey of family expenditures is likely to be somewhat biased by under-represen-

⁸² It would be desirable to have separate estimates of landlords' expenditures on household furnishings. Changes in the value of consumers' holdings of such goods could then be analyzed separately or in combination with changes in the value of landlords' holdings. Likewise, it would be useful to have space rent estimates confined to the rent of the structure proper and to have expenditures estimated for heating facilities and various household fixtures by landlords and occupants, respectively.

tation of high income families and consequently of the highest income families within the top group. Average expenditures yielded by a sample survey for the highest income group are therefore likely to be too low, and estimates of aggregate national expenditures for goods with a high income elasticity may be grossly understated. In other words, a moderate increase in the estimated average outlay of high income families on luxury goods may affect estimated aggregate expenditures considerably.

A second problem, less serious than the income bias, is that the sampling variance of expenditures by high income families is great. Statistical adjustments are possible, but at present cannot be carried through with any great assurance because of lack of knowledge regarding the consumption function at high income levels. Since the 1935-36 and 1941 studies (and the 1944 survey in urban areas) were the first in which information from families at all income levels was sought, there is not yet a sufficient body of information from which to determine the spending habits of high income families.

Income tax data, together with sample reports on the characteristics of families that refuse to furnish information, yield a reasonably satisfactory basis for adjusting the income distribution and the average income for the upper ranges of the distribution.³³ This does not, however, solve the problem of determining the appropriate adjustments to be made in the average expenditures to correspond with the income adjustment. In future surveys special effort might well be devoted to trying to improve the sample of high-income families; e.g., by enlisting the cooperation of trade and professional associations. Oversampling this group would, in addition, reduce the sampling variance.

Neither the income bias nor the high sampling variance of

³³ See BLS, Bulletin 822, pp. 22-8 and 41-53; National Resources Committee, *National Income in United States*, App. A, Sec. 7 and 8; *Studies in Income and Wealth, Volume Three*, Part 3, Enid Baird and Selma Finé, "The Use of Income Tax Data in the National Resources Committee Estimate of the Distribution of Income by Size".

averages for the highest income group are of great consequence if family surveys are planned mainly to yield inventory data or consumer price reports. The estimated number of most goods owned by consumers that it would be practical to inventory would not vary widely enough to be significantly modified by an alteration in the income distribution or in the average for the small proportion of families with high incomes. Only in dealing with expenditures, when wide variations in the prices paid and the frequency of purchase are possible, are these factors significant.

A third general problem concerns the inclusion of families that existed during only part of the period covered, particularly newly-weds, whose purchases comprise a sizeable proportion of all purchases of housefurnishings. Since the major interest in family expenditure surveys has been in patterns of expenditure at different income levels, the coverage of part-year families has been relatively little emphasized. They were included in the 1941 but not the 1935-36 survey. Families formed during the period under survey and those merged with other families are relatively easy to cover, but it is difficult and sometimes impossible to obtain information on the expenditures of some types of family that ceased to exist before the time of interview.³⁴ It might appear that expenditures should be included only for families that exist at the time, but durables purchased during the year are likely to continue in someone's possession even if the family that made the purchase no longer exists. Hence, the expenditures for such goods should be included if the value of stocks of goods is estimated from expenditures.

Since families formed during the year are relatively easy to sample, the problem is not important if the value of consumers' stocks is to be derived from inventory data, which must apply to a single point in time—ordinarily the end of the survey period. 'Loss' of certain types of family that ceased to exist be-

³⁴ As in the case of the death of a one-person family or induction into military service of a man or woman living as a single consumer before induction. The latter were estimated to number 1,060,000 year-equivalent persons in 1941.

fore the time of interview should not affect price distributions, for the proportion of purchases involved would be small.

A fourth but relatively minor general problem, one that leads to over- rather than understatement, is the inclusion of expenditures for purchases by one individual from another individual. This is frequent chiefly in the case of household durables, and probably would not lead to much overstatement. On the family's balance sheet the transaction appears as a reduction in personal assets for the seller, but the expenditure aggregates reflect a duplication.³⁵ This duplication could be eliminated if schedules were designed with the problem in mind. It has no bearing, of course, on the inventory estimates and is not sufficiently common to affect the price distributions.

In addition to these four general problems, three factors limit the usefulness of the expenditure data from the 1935-36 and 1941 surveys for estimating the value of consumers' stocks. The 1941 survey sample, designed to yield a quick national summary for administrative purposes, was so small that the average expenditure for any item has a high sampling variance. The Consumer Purchases Study sample, on the other hand, was very large, but was designed specifically to facilitate analysis of variations in expenditures that might be associated with family type, occupation, region, and size of community. For that reason the expenditure sample (though not the income sample) was confined to a population as homogeneous as possible with respect to all other factors: nonrelief families containing husband and wife, both native born and, except in the South and a few large northern cities, both white. To sharpen the contrast between communities of different sizes, families in suburban areas were excluded. No rural or urban families were sampled in the Southwest. The National Resources Planning Board estimates of expenditures by the nation's families were

³⁵ The Department of Commerce series, on the other hand, does not reflect the transaction. In secondhand purchases through dealers its series includes as a service the amount of the dealers' margin, but in transactions among consumers the equivalent of this margin (the difference between what the seller could get from a dealer and what he receives from another consumer) is not recorded.

therefore necessarily built up on the assumption that the spending of families of the types not surveyed was the same as that of families of the type covered, if they were of similar size, income, and occupation. Though there is no body of evidence on this subject, there is some reason to question the assumption. Expenditures of single persons were estimated from very meager data which furnished a basis only for broad category totals.

The treatment of gifts on the schedules used in these two surveys is the second problem. Gifts exchanged among family members are recorded as family purchases, but the outlay for gifts to outsiders is not itemized. (The value of certain types of gift received is recorded, but not itemized, as income in kind.) Consequently, consumers' expenditures for commodities such as jewelry, clothing, household textiles, tableware, and books are considerably understated. In the Survey of Prices Paid by Consumers in 1944, somewhat more detailed information was requested about gifts bought for friends and relatives. It was found that city families and single persons spent 3.4 percent as much for gifts of clothing and jewelry as for clothing and jewelry purchased for family members. The corresponding proportion for all housefurnishings was 3.9 percent, and for toys, games, sports equipment, and books, nearly 30 percent.

A final problem is the classification of items, i.e., the occasional combination under one heading of expenditures for goods and services and of commodities of varying degrees of durability. If survey expenditure data were collected for the purpose of estimating wealth, this could be taken into account in designing schedules.⁸⁶

⁸⁶ The schedule prepared for use in a nationwide survey of family income and expenditures in 1943 was designed to yield totals by degree of durability. Since the survey was never carried through, it is impossible to judge what the collection difficulties would have been. In general, the problem is less serious when using expanded survey data, which are in great detail, than when using the Department of Commerce series.

4 *Tentative Estimates of the Value of Consumers'
Tangible Assets, 1929, 1939, 1946*

The validity of estimates of the value of consumers' stocks, as previously indicated, is conditioned by the reliability of information on the length of useful life of the goods valued as much as on the precision of inventory and price or expenditure data. Hence, given a need for some estimate of the value of consumers' capital, that estimate must be looked upon as very tentative because of the guesses at length of life and rate of depreciation (Table 3).

Table 3
Estimated Value of Consumers' Tangible Assets, December 31,
1929, 1939, 1946; Current and 1939 Prices
(millions of dollars)

	TANGIBLE ASSETS OTHER THAN AUTOMOBILES		PASSENGER AUTOMOBILES *	
	Current prices	1939 prices	Current prices	1939 prices
1929	47,537	36,632	7,398	6,645
1939	35,468	35,468	5,972	5,972
1946	80,598	49,971	11,670	4,277

For the estimating procedures, see the text.

* Excludes the value of the portion of passenger automobiles owned by consumers that was devoted to business purposes.

a *Consumer goods other than automobiles*

To estimate the total value of tangible assets owned by consumers in 1929, 1939, and 1946, the estimated depreciated value in each of those years of goods purchased in preceding years at prices prevailing in the year to which the estimate applies was added to expenditures in that year. For example, for a group of commodities whose life is assumed to be six years, the value of holdings in 1939 was taken as the sum of expenditures in 1939 plus five-sixths of the 1938 expenditures in 1939 dollars, plus four-sixths of the 1937 expenditures in 1939 dollars, etc. In building up the estimates, each subgroup of durable commodities (other than automobiles, their parts, and accessories) presented in the Department of Commerce

series on personal consumption expenditures and each of four other commodity subgroups (clothing, footwear, semidurable housefurnishings, and toys, games and sports goods) was handled separately.⁸⁷

The life span estimates were taken from various sources. For most durables the Bureau of Internal Revenue was the main source, although probably its estimates of the average life of consumer durables used in business are lower than would be found characteristic of the same goods used in households. For books and for monuments and tombstones, in the durable group, and for toys and sports goods a guess had to serve. For clothing, footwear, and semidurable housefurnishings (predominantly textiles), approximations were developed from survey information on the proportion of families purchasing such goods in a year and comparison of the replacement cost with the total cost in a year of the stock of goods the Heller Committee judged to be required by urban wage earner families.⁸⁸ For these three subgroups, cumulative depreciation rates were assumed because of the inclusion in each of many articles with a life span of a few months and others with a life of some years. For all other groups constant depreciation was assumed. The average length of life ranged from 3 to 20 years.

⁸⁷ To expenditures for furniture and clothing (exclusive of standard clothing issued to military personnel), we added expenditures for net purchases from secondhand furniture and antique dealers and from secondhand clothing dealers, respectively. Expenditures for collectors' net acquisitions of coins and stamp collections (a service item) were not included—although these and other collections are properly part of consumers' wealth—because it is impossible to build up a reasonable estimate of their aggregate value from this series. Since the series on personal consumption expenditures does not distinguish semidurable from perishable toys and sports supplies, a rough allocation was based on the value of product for these goods in biennial years, 1929-39, as shown in *Output of Manufactured Commodities* (Department of Commerce, Oct. 1942). Expenditures for tools in 1943-46, combined with miners' expenditures for explosives, lamps, and smithing, were estimated from the average ratio of the two groups of expenditures for 1929-42.

⁸⁸ Heller Committee for Research in Social Economics, University of California; see especially *Clothing and House Furnishings Allowances, Prices for San Francisco, March 1942: Supplement to Quality and Cost Budgets for Three Income Levels*.

ESTIMATED LIFE, VARIOUS CONSUMER GOODS

	Years
Furniture	12
Floor coverings	9
Refrigerators & washing & sewing machines	16
Miscellaneous electrical appliances except radios	8
Cooking & portable heating equipment	12
China, glassware, tableware & utensils	11
Durable housefurnishings	8
Products of custom establishments	
Writing equipment	
Semidurable housefurnishings	5*
Radios, phonographs, parts & records	9
Pianos & other musical instruments	16
Shoes & other footwear	3*
Clothing & accessories except footwear	4*
Jewelry & watches	13
Luggage	7
Ophthalmic products & orthopedic appliances	4
Books & maps	6
Wheel goods, durable toys, sport equipment, semidurable toys & sports supplies	4
Boats & pleasure aircraft	14
Tools	6
Monuments & tombstones	20

* Assumed values remaining at the end of the designated number of years were.

	SEMIDURABLE HOUSEFURNISHINGS	SHOES & OTHER FOOTWEAR	CLOTHING & ACCESSORIES EXCEPT FOOTWEAR
1 year	95	75	90
2 years	70	40	50
3 years	50	10	25
4 years	30	0	10
5 years	10	0	0

Disagreement about the life estimates we used will probably be extensive. An estimate of the value of all consumers' tangible assets should nevertheless be closer to the 'true' value if built up from details than if all consumer durable and semidurable goods, respectively, are treated as a group, as by the NRPB, since the composition of these broad expenditure aggregates varied considerably over the years. Possibly the life estimates for mechanical appliances should have been less for the earlier than for the later years because of technological improvements, but lack of specific information made it impracticable to take account of this.

Expenditures for 1929-46 were converted to constant dollars with preliminary unpublished price indexes prepared by the Department of Commerce, National Income Division, and

generously made available to me.³⁹ Most of the indexes are recombinations of the relevant components of the Bureau of Labor Statistics index of consumer prices (cost of living) and of the Bureau of Agricultural Economics index of prices paid by farmers. Price quotations from these two sources for corresponding commodities were usually combined in accordance with the expenditures of urban and rural families, as shown by the 1935-36 study. For commodities not represented separately in these indexes, price data were taken from other sources when possible. When no specific price quotations could be had, the respective weights of such commodities were assigned to the prices of related or analogous commodities. The weights employed for the minor commodity group price indexes were the 1939 values of the individual commodities, as shown in the *Output of Manufactured Commodities* (Bureau of Foreign and Domestic Commerce, 1942). The series for 1942 through 1946, when many goods were unavailable, have a wide margin of error, and to that extent affect the reliability of our estimates of 1946 holdings.⁴⁰

Annual personal consumption expenditures for 1919-28 were extrapolated by linking Mr. Kuznets' estimates of commodity flow to consumers at wholesale prices in 1929 dollars to the Department of Commerce series.⁴¹ *Commodity Flow and Capital Formation* presents data for subgroups only at whole-

³⁹ Henry Shavell presents retail price deflators for consumer commodities 1929-42 by commodity groups as they were classified before they were revised (*Survey of Current Business*, May 1943). He indicates the composition of the minor commodity group indexes with respect to the specific price data used and their sources, and discusses the general methodology by which the indexes for the later as well as the earlier years were constructed.

⁴⁰ The series had been extended through 1946 for only a portion of the groups needed. We estimated the changes from 1945 to 1946 for other groups, following in general the methods used for earlier years.

⁴¹ The Department of Commerce and Kuznets' subgroup classifications correspond reasonably well. In a few cases, however, to obtain sufficient comparability for linking, a minor commodity series (*Commodity Flow and Capital Formation*, Table II-7 or II-5) was adjusted by means of detailed data on the output of finished commodities (ibid., Table I-4) or subgroups in one series or the other were combined. The Department of Commerce series on tools for personal busi-

sale prices; estimates at cost to consumers are presented for three broad durability categories. The link was made at the wholesale level in order to preserve the detail of the Department of Commerce estimates. Implicit in this procedure are the assumptions that an index based on wholesale prices would not differ significantly from one based on cost to consumers and that the consumers' share of the total was the same during the 11 years through 1929 as in 1929. Both assumptions are of course subject to considerable question. As previously noted, Mr. Kuznets defined consumers to include larger ultimate consuming units such as hospitals and hotels as well as households, and he classified durable goods on the basis of preponderant use.

For years before 1919 aggregate expenditures on the relatively few classes of durables estimated to have an average life of more than 11 years were based on W. L. Lough's expenditure figures in *High-Level Consumption* (McGraw-Hill, 1935) for 1909, 1914, 1919, and subsequent biennial Census periods.^{41a} The relation between these expenditures and Isador Lubin's series of national income estimates was studied, and estimates for the appropriate years obtained by interpolation.⁴² For most categories, the trend shifted sharply in 1921 or 1923; the estimates were therefore based on the 1909-19 relation, which was linear. The expenditures so derived were deflated by the most appropriate index available for those years.

Our estimates for each year are open to question both be-

ness and household and garden use were extrapolated with Mr. Kuznets' series for carpenters' and mechanics' tools, which he classified as producer durables.

For deflating subgroups for which Mr. Kuznets found no specific price indexes, we used his derived price index for the major commodity group in which the subgroup was classified. This corresponds to his use of the derived index for deflating the residual parts of the major commodity group for which he had no specific indexes.

^{41a} Had W. H. Shaw's *Value of Commodity Output since 1869* (NBER, 1947) been published when these estimates were prepared, we would not have had to link Lough's expenditure estimates to Kuznets'.

⁴² *Economic Trends*, Testimony before the Temporary National Economic Committee (1939), Appendix, Exhibit 5.

cause of the assumptions concerning length of life and because of deficiencies in the price data used for deflation.⁴⁸ They are subject also to all the limitations, as described above, due to the use of the Department of Commerce series on consumption expenditures and (particularly in the case of the estimate for 1929) the method of extrapolating this series for years prior to 1929. The inclusion, except for four groups of commodities, of the full amount of expenditures made during the years ended December 31, 1929, 1939, and 1946, respectively, means that commodities averaging 6 months in age were considered new, and implies some overestimate of their value. Implicit prices for the goods included are average prices during the year rather than those prevailing at the end. Since prices were relatively stable during 1929 and 1939, this does not appreciably affect the evaluations for those years. For 1946, however, the value of consumers' tangible assets as of December 31 is considerably understated because of the rapid rise in prices during the year.

The 1929 estimate—considerably less than the NICB and Keller's estimates—is probably low. The 1946 estimate is especially questionable because of the possible unreliability of the individual commodity series for 1940-46 and the special limitations of the price data for 1942-46. It may understate the value of holdings as of December 31 not only because of price advances during the year but also because it was based on pre-war replacement rates which have a style element. There is every reason to believe that the life of refrigerators, stoves, washing machines, and other household durables was 'extended', as was the life of automobiles, by the absence of new models to tempt the public and the necessity for getting continued service from those in use. This is not to say, however, that the real value of consumers' tangible assets in 1946 approached the value that might have been expected at the 1946 level of

⁴⁸ The reliability of the deflators is important not only for the 1929 and 1946 estimates in 1939 prices, but also for the estimates in current prices since expenditures made during years prior to the ones to which the estimates apply were adjusted to the prices of that year to estimate the value of holdings at the end of the year.

national income had consumer durable goods been generally available. In 1939 dollars, on the other hand, the 1946 estimate is probably high to the degree that the price indexes used as deflators understated the real price increases due to wartime quality deterioration, which could not be fully measured.

b Automobiles operated for personal use

The information available for evaluating passenger automobiles owned by consumers and operated for nonbusiness purposes is relatively good, at least for 1939 and 1946, although several assumptions were required to project the 1941 survey data to those years. For 1929 rougher methods had to be adopted. Two types of data were needed: (a) a distribution by age of cars owned by consumers entirely for personal use and of cars owned partly for personal and partly for business purposes, and for the latter, the proportion of use that was personal; and (b) prices for cars of varying ages in each year.

The 1941 survey yielded data of the first type for the end of that year.⁴⁴ A few cars reported as not in operation were included on the assumption that they were usable; a few small trucks reported as operated entirely or predominantly for family use were included with passenger automobiles, although this involved some inconsistency in comparisons with total passenger car registrations (Table 4). The 1935-36 survey data on automobile ownership could not be used as a check on the 1941 findings because estimates of the number of cars owned by single persons are very poor; estimates of the number of cars owned by families formed during the year are not available; and information was not obtained on the model year of cars purchased secondhand.

⁴⁴ Since the survey data had not previously been processed in the form required, all survey schedules had to be retabulated to obtain the number of cars owned at the end of 1941 by age, by proportion of use for business, if any. Reports by families that were formed during 1941 were included. When the year of purchase for cars bought new differed from the model year, the former was used as a measure of age. Special tabulations of the rural survey data were generously made available by the Department of Agriculture, Bureau of Human Nutrition and Home Economics.

Table 4
Age and Number of Passenger Automobiles Owned by Consumers,
Percentage Registered, and Percentage Used Partly
for Business, 1941

AGE OF CAR	PASSENGER AUTOMOBILES OWNED BY CONSUMERS		
	Total (000)	As % of all pas- senger car registrations	% used partly for business
Under 1 year	3,248	87.0	32
1-2 years	3,268	93.5	31
2-3 years	2,413	98.0	27
3-4 years	1,873	94.0	26
4-5 years	3,351	90.0	25
5-6 years	2,862	84.0	25
6-7 years	1,672	80.0	25
7-8 years	1,277	78.0	25
8-9 years	983	77.5	26
9-10 years	778	76.0	28
10 years & older	3,222	70.0	35
Total	24,949	84.6	28

Estimates based on the Survey of Spending and Saving in Wartime. The figures in column 2 were rounded and do not add to the total. The percentages in columns 3 and 4 were derived from smoothed data.

Information on total passenger cars registered is available for the end of 1929, 1939, and 1946, and on the number of new cars registered in each of these years.⁴⁵ Information on the distribution by age of passenger cars registered has been compiled by R. L. Polk and Company (Detroit) as of July 1 for all years beginning with 1935 except 1942-45.⁴⁶ For December 31, 1941, the number of passenger cars of different ages was estimated by subtracting new car registrations from the total for

⁴⁵ According to C. F. Roos and Victor von Szeliski, 'Factors Governing Changes in Domestic Automobile Demand', *Dynamics of Automobile Demand* (General Motors Corporation, 1939), pp. 45-6, Bureau of Public Roads figures on registrations for the year-end contain duplications because in about half the states new license plates must be obtained when cars change ownership. Since, as they point out, the counts of titles registered as of July 1, compiled by the R. H. Donnelley Corporation for each year since 1933, reveal obvious inconsistencies, we used the Public Roads registration figures which extend back beyond 1933. Registrations (without duplication) do not represent the entire stock of cars, since some usable cars may be in storage or standing unused on back lots and, as Roos and von Szeliski suggest, enforcement of registration laws in some outlying districts may be lax, especially during depressions.

⁴⁶ *Automobile Facts and Figures, 1946 and 1947*, p. 21. Age was reported for 98-95 percent of all registrations.

that date and applying to the remainder the estimated age distribution as of July 1, 1941, of cars one or more years old.

The number of cars of different ages at the end of 1939 and 1946 was estimated similarly. An age distribution for July 1, 1940, as well as July 1, 1939, made greater precision possible for 1939. The age distributions of cars more than a year old on these two dates were averaged to yield a distribution for December 31, 1939. For 1946 it was assumed that the proportion of all cars produced before 1946 that were 4-10 years old was the same on December 31 as on July 1, and that the proportion ten years or older declined relative to the larger number of new cars sold during the six months. Since figures on registrations by age of car could not be obtained for 1929, a different procedure was required. New car registrations had been compiled for each year 1925-29, but for earlier years output statistics alone were available. The average ratio of new cars registered to cars produced 1925-29 was applied to annual output in the three preceding years to obtain an estimate of new car registrations in those years. From total registrations on December 31, 1929, we subtracted the sum of new car registrations in each year 1926-29 and decreasing proportions of estimated new car registrations in the three preceding years to obtain the estimated number of cars 8 or more years old.⁴⁷

To estimate the number of passenger automobiles of different ages that were owned by consumers in the three years, we applied ratios developed by comparing the expanded 1941 survey aggregates with the estimated total of cars of different ages on December 31, 1941. The over-all ratio was about 85 percent; the different age groups, smoothed by three-point moving averages, showed a peak of consumer ownership for 2- to 3-year-old cars, followed by a decline with age, reflecting the large number of older cars used exclusively for farm business, then an

⁴⁷ Our estimates of the number surviving in the 4th through the 8th years (1925, 97 percent; 1924, 95 percent; 1923, 85 percent; and 1922, 75 percent) correspond closely to the survival estimates used by Keller. Some of the arbitrary element in his and other estimates that built up to a total by applying survival rates to production figures over a period of years is eliminated by tying the assumed age distribution to total registrations at the end of 1929.

upturn in the case of the jalopies 15 or more years old. In the absence of specific information to the contrary, these ratios were assumed to be applicable in 1939 and in 1929 and, with slight modification, in 1946.⁴⁸ The estimated number owned in each year was then apportioned between those owned exclusively for personal use and those owned and operated partly for business purposes on the basis of the 1941 survey findings.⁴⁹

Since business use of passenger cars is much more common on farms than in nonfarm areas, both the ratio of cars owned by consumers to all cars registered and the proportion of con-

⁴⁸ For 1929 and 1939 the number obtained by applying the 1941 ratios for each age group were added and the total compared with the total obtained by taking 84.6 percent of all registrations. For 1939 the difference was less than 0.3 percent; for 1929 it was 4.3 percent. For these years the number in each age group was adjusted to equal the 84.6 percent of all registrations. For 1946 it was arbitrarily assumed that 75 percent of 1942 cars were owned by consumers. For older models the ratios used to estimate cars owned by consumers were the same as for the 1929 and 1939 estimates; e.g., 1941 cars were considered 1-2 years old, etc.

For new cars owned at the end of 1946 we made two estimates: one on the assumption that 50 percent of new cars registered—about .9 million—were owned by consumers; the other that 1.5 million 1946 cars were owned by consumers at the end of 1946. The 50 percent was arbitrarily selected on the ground that a large share of the first postwar cars were reserved for business fleets, etc; it is probably low. The 1.5 million represents the number of new cars estimated by the Survey of Consumer Finances to have been purchased by consumers in 1946 (*Federal Reserve Bulletin*, June 1947). This is believed too high as it represents a larger proportion of new car registrations than in 1941. The two assumptions yield estimated values of all automobiles owned by consumers at the end of 1946 (in millions) of \$11,387 and \$11,953, respectively, in current prices, and \$4,093 and \$4,461 in 1939 prices. The figures in Table 3 are averages of the two estimates.

⁴⁹ Families' reports on the proportion of car use chargeable to business are subject to a considerable margin of error. The survey schedules were therefore reviewed, and whenever business use was reported by persons whose occupation did not logically involve the use of an automobile, the report of business use was discounted on the assumption that it referred to transportation to work. A similar check was not possible, however, on the proportion of use chargeable to business when some charge was appropriate. When the distribution of cars by proportion of use chargeable to business in 1941 was analyzed, the modal report was found to be 75 percent, the median, 65 percent; there was no significant difference by age of car or between farm and nonfarm owners. Since there was a tendency to overestimate business use of cars because gasoline rationing was inaugurated while the survey was in process, the correct proportion was assumed to be 60 percent.

sumers' cars that were owned and operated partly for business purposes would vary with changes in the relative number of farm and nonfarm families. Hence, the proportion of all cars owned by consumers and the proportion of these operated exclusively for personal use was probably somewhat lower in 1929 and somewhat higher in 1946 than in 1941. No attempt was made to adjust for changes in the farm population by re-weighting the survey findings for farm and nonfarm areas because it would have been necessary first to convert the Census population estimates for 1939 and 1946 to a consumer unit basis in accordance with the survey concept, and the information necessary for such a conversion was not available.

Independent estimates were available of average prices of new cars in 1929 and 1939 and of used cars by age in the latter year. Each related to prices during the year rather than at the end; prices as of the end of the year were not available. For consistency, we estimated average prices of used cars during 1929 and of cars of all ages during 1946. The new car average prices used for 1929 and 1939 were computed by the Automobile Manufacturers Association. Although they are for a single model, relatively inexpensive, they were used as more reliable than any rough estimate we could make of an average price for all models of all makes.⁵⁰ For 1929 the new car average price was \$843; for 1939, \$768. A comparable price, \$1,183, for 1946 was estimated by applying to the 1940 average the percentage increase in the Bureau of Labor Statistics index of retail automobile prices from 1940 to the average for the last four months of 1946.⁵¹ The \$1,183 represents a considerable understatement.

⁵⁰ *Automobile Facts and Figures, 1940*, p. 72. The averages for each year 1925-40 "are based on the delivered price at factory (including standard equipment and federal taxes) of the cheapest 4 or 5 passenger closed model of each make and are weighted by the relative total number of new car registrations of each make. Delivered price prior to 1936 computed from the ratio of factory list price to delivered price in 1936 and 1937."

⁵¹ Prices for the index, based on 5-passenger sedan list prices of Fords, Chevrolets, and Plymouths, were not obtained for the earlier part of 1946. Since most of the sales took place in the latter part of the year, the average for the last four months of 1946 seems more appropriate than an average based on indexes for all 12 months.

ment because it does not reflect the large premiums new cars commanded in the used car market.

The prices in 1939 for cars of each model year 1930-38, compiled by the National Automobile Dealers Association,⁵² were used to estimate the value of used cars in that year with an assumed value for all older cars of \$60, or 75 percent of the price of cars 9-10 years old. Analysis of the relation between a new car price as presented by the Automobile Manufacturers Association and prices of used cars of different ages showed considerable similarity from year to year, 1935-41. On the basis of the relation during these years, prices in 1929 of cars 1-7 years old, respectively, in that year, were estimated from the new car price; for cars 8 or more years old, a price of \$100 was assumed, or approximately 74 percent of the price of cars 7-8 years old. In the absence of summary information from trade sources on used car prices in 1946, they were estimated by applying to the 1941 averages compiled by the National Automobile Dealers Association the percentage increases between the 'sales value' in 1941 and the 'average retail value' in 1946 of identical models of Fords, Plymouths, and Chevrolets for 1934-40 models.⁵³ Applying to the estimated 1946 average price for 1940 cars the ratio of the 1946 average retail value of 1941 and 1942 Fords, Chevrolets, and Plymouths to the 1946 average retail value of 1940 cars of the same makes gave 1946 prices for 1941 and 1942 cars. A similar procedure yielded estimates for 1933 and 1932 car prices; a junk value of \$90, or 74 percent of the 1932 car price, was assumed for all older cars.

The sum of the products of these prices and the number of

⁵² *Automobile Facts and Figures*, 1942, p. 14. Figures read from chart.

⁵³ *Red Book National Used Car Market Report*, 130th ed., July-August 1941, and 149th through 153rd ed., effective January 1, April 1, July 1, October 1, 1946, and January 1, 1947.

The percentage change in prices was estimated by comparing the July-August 1941 price with the average 1946 price (the averages of prices in each of the 5 reports listed) for each model. The 'sales values' quoted for 1941 were defined to represent the average prices reconditioned used cars in the hands of dealers were selling for. Similarly, 'average retail values' quoted for 1946 were defined to "reflect actual average retail prices of used cars—reconditioned, ready for resale".

cars of different ages that were owned by consumers exclusively for personal use plus 40 percent of those of different ages owned partly for business purposes yielded the estimates of the value of such cars in 1929, 1939, and 1946, in current prices shown in Table 3. For 1929 and 1946, values in 1939 dollars were approximated by substituting for new car prices in each year the 1939 new car average price and by deflating the aggregate value of cars more than one year old by an index of average changes in used car prices.⁵⁴ This procedure undoubtedly leads to some overstatement of 1929 values in 1939 prices because of the improvement in quality, a factor that could not be measured. Identical cars were not available new at the three dates.

Our estimate for 1929 in current prices is high in comparison with the NICB and Keller estimates, since both included automobiles operated for business purposes, and the former included also motor vehicles other than passenger automobiles. The NICB provides insufficient information for an analysis of its methodology, but Keller outlines his method carefully. There are several differences between his and our valuation procedure: we valued cars less than a year old at new car prices, whereas he assumed a 21 percent depreciation by the end of the first year; for new cars we used the weighted average retail price for 4-door 5-passenger sedans, whereas he used the average wholesale value of all cars inflated one-third; and we estimated used car prices at 1929 price levels whereas he used depreciated original cost. Our method of valuing new cars would yield a higher figure than Keller's, while our method of

⁵⁴ The change in used car prices between 1939 and 1946 was estimated by comparing the estimated 1946 price of 1942 cars with the average price of cars 1-5 years old in 1939, the 1946 price of 1941 cars with the average price of cars 2-6 years old in 1939, etc. Seven such indexes were developed and averaged to yield an index of approximately 300. The increase was, of course, bigger than if 1942 and 1941 cars had been considered 1-2 and 2-3 years old, respectively, in 1946 (because of the lack of production during the war) and considerably less than if 1941 and 1942 cars had been treated as 4-5 and 5-6 years old. Although that was their actual age, they had undoubtedly had less wear because of gas rationing and as a group had received better care because of the general effort to prolong car life. Moreover, the cars produced in the years immediately before the war were better than those produced in the mid-thirties and earlier.

valuing used cars would yield a lower aggregate since automobile prices declined during the 'twenties.

The value of automobile tires and tubes, replacement parts and accessories (which could be estimated from annual expenditures) was not added to the value of automobiles derived as described above, because secondhand automobile prices presumably reflect the customary amount of replacement and the extent to which accessories such as radios and heaters had been installed. Hence, if the two aggregates were combined, there would be a duplication of the value of parts and accessories.⁵⁵

C RECOMMENDATIONS FOR DATA COLLECTION

Our general recommendations concerning the type of data needed to value consumers' tangible assets have already been made. The mechanics of obtaining them and the frequency of collection that is at once both desirable and feasible remain to be considered.

As a general proposition we have argued the logic of obtaining information directly from consumers on a sample basis. We have discarded the possibility of requesting consumers to provide a reliable estimate of the value of the goods they own. In theory, therefore, a count should be obtained of all goods owned by consumers, down to sheets and towels, pots and pans, shirts and shorts, and an average price for each item by age; the product of the number and the prices would represent the aggregate value of consumers' stocks. The possibility of obtaining an almost complete enumeration of household goods, clothes in closets and bureau drawers, and knickknacks on table tops has been demonstrated by special surveys conducted by the John B. Pierce Foundation to measure housing space requirements.⁵⁶ Such surveys are time-consuming and rela-

⁵⁵ Even in the case of durables that are seldom sold secondhand, valuation on the basis of inventory data or annual expenditures cumulated over an appropriate period may be assumed to reflect customary servicing, which significantly lengthens the useful life of the commodity.

⁵⁶ *Family Living as the Basis for Dwelling Design*, IV: 'Family Behavior, Attitude and Possessions' (1944).

tively costly. Moreover, the usefulness of an inventory for every date for which the value of stocks is to be estimated depends upon the possibility of pricing it completely, and it would be unrealistic to contemplate pricing the almost infinite number of items that comprise consumers' stocks.

1 *Data on Stocks and Useful Life*

Valid estimates of the value of consumers' stocks of durable household appliances and other mechanical goods, as well as of automobiles and new types of durables entering the market, require frequent inventory studies and evaluation by pricing articles of different ages. The life expectancy of such goods has changed over the years because of economic conditions and changes in technology. Similar, if less striking, changes may be expected in the future. Hence, there is need for inventories, by age, at or near the dates for which estimates of the value of consumers' stocks of such goods are desired. Projections from one period to another when circumstances differed, as in the use of the 1941 automobile age distribution for 1946, are unsatisfactory.

If it is impossible to take a sample inventory applying to the date for which the value of consumers' stocks is to be estimated, life expectancy estimates must be constructed from data collected in inventory studies.⁵⁷ Account must be taken also of changes in both the number of ownership units and the age composition of the family population, since the age distribution of any durable is determined in part by the proportion of young and old families in existence at the time.

For the many smaller and less durable goods, on the other hand, evaluation by cumulating expenditures over an appropriate period would probably be more reliable than by pricing inventories on a sample basis. Furniture, floor coverings, pianos, etc. are in an intermediate position. It would not be unduly laborious or costly to count them and record informa-

⁵⁷ See O. L. Altman and C. G. Goor, 'Actuarial Analysis of the Operating Life of B-29 Aircraft Engines', *Journal of the American Statistical Association*, June 1946, and Roos and von Szeliski, *op. cit.*

tion on their age at regular intervals, but the determination of appropriate prices would be subject to so wide a margin of error that cumulation of expenditures would probably be equally, if not more, satisfactory. In both cases, the reliability of the value estimates would depend upon the accuracy and appropriateness of the expenditure data and of the estimates of useful life. The most pressing need is for good data to estimate life in use.

To estimate the average number of years that furniture, etc. is used in households, surveys should be made that would yield counts of such goods in a representative sample of households, together with information on their age. Since purchases of furniture, floor coverings, etc. are postponable, their apparent life in use is undoubtedly different in depression or inflation than in periods of high real incomes. Consequently, such studies should be replicated at different stages of business cycles. Then, if significant differences are found characteristic under different economic conditions, the life estimate to be used in evaluating consumers' stocks from expenditures on a particular date could be determined by the general level of income on that date.

A somewhat different approach would be more appropriate for estimating the life in use of household linens, apparel, footwear, kitchen utensils, tableware, clocks, the more durable types of toilet article, etc.: a survey, or preferably a series of surveys, that would yield a count of such items owned at the time, the number purchased for own use or received as a gift and the number discarded during the preceding year, and the amount spent on purchases. Discards as well as purchases would be necessary to derive the inventory at the beginning of the year from the year-end inventory. The ratio of the average number acquired during the year to the average number owned would yield an estimate of useful life; for example, if on the average 10 sheets were owned and 2 were purchased each year, it could be assumed that sheets last five years. Estimates derived in this fashion should be applicable for long periods unless general economic conditions change sharply. At the outset a

series of identical studies would be highly desirable, since the relation between several years' purchases and several inventories would yield more reliable estimates of useful life than comparison of purchases during a year with the year-end inventory or the average of the inventories at the beginning and end of the year. Collecting such information for several years from a representative panel of consumers would be cheaper than collecting inventory information by a series of studies. However, it is hard to maintain a continuing sample, both because consumers lose interest unless incentives to cooperation are offered (and a sample made up of persons who were attracted by rewards may be unrepresentative) and because families move and it is difficult to select appropriate replacements. The costlier technique, a series of inventory-purchase-discard studies, may therefore be more efficient in the long run. Estimates of life for groups of commodities could be derived by weighting together the various life estimates by the expenditures for items found to have that length of life.

For each type of study the sample must be representative of all types of community and all regions. In surveys of soft goods and semidurables, care must be taken to cover lodgers and servants in their proper proportion if the measure of the life of stocks of personal goods is to be accurate. The furniture survey, on the other hand, may be confined to families and single persons other than lodgers and servants. Since stocks are relatively more stable than purchases, a small sample of perhaps 3,000 to 5,000 should suffice. For any size of sample national estimates will be more reliable if urban and rural populations are sampled proportionately to their number, although with a small sample this might not yield accurate data for urban and rural segments separately.⁵⁸

In addition to the data the survey is designed to yield, information should be collected from respondents on the general level of income, tenure, and perhaps rents, and on certain

⁵⁸ For a discussion of sampling variance with respect to income estimation, see BLS, Bulletin 822, pp. 57-9. Proportionate sampling reduces appreciably the cost of summarization.

family and personal characteristics, to provide a basis for checking the representativeness of the sample. As previously noted, however, some downward bias in income, more or less to be expected in a small survey, should not have a very significant effect on findings concerning inventory, or even the number of goods purchased. Fully as serious is the possibility that low income families and single persons with meager stocks will be reluctant to cooperate.⁵⁹

Reports on the number of items purchased and owned and, in the case of soft goods and small durables, the number discarded should not be difficult to obtain if the schedule is sufficiently detailed and interviewers are properly trained.⁶⁰ Instructions must be clear on the method of recording goods owned but not used. As a general rule, they should be counted if in usable condition or temporarily out of order, but in the case of apparel, particularly women's, there may be borderline cases, e.g., dresses that will never be worn again and will end in the scrap bag. Approximations will undoubtedly have to be accepted in many cases on the age of durables, but a reasonable balance may be expected among those understating and those overstating age. If, as is likely in the case of secondhand purchases, the actual age is not known, the year of purchase and information on condition at time of purchase should be recorded; from it an approximate age may later be estimated.

Undoubtedly for some goods, for example, jewelry, books, and tombstones, it will be impracticable to develop meaningful life estimates. For such goods, which fortunately comprise a small segment of consumers' tangible assets, guesses will prob-

⁵⁹ In the Survey of Prices Paid by Consumers in 1944 refusers were about equal at very low and at high income levels. The apparent explanation for the low income refusals was a reluctance to reveal poverty at a time of general prosperity and, in some cases, resentment at the inadequacy of public provision for assistance.

⁶⁰ The lack of success in obtaining apparently reliable reports on clothing inventories in the Survey of Spending and Saving in Wartime must be charged to poor schedule design in this respect, the tremendous detail requested on other points, and a failure to emphasize the need for this information in the training of interviewers.

ably always have to serve. Some test studies might prove valuable, however, especially in the case of jewelry, which is a heterogeneous composite of almost imperishable 'good' jewels and costume jewelry with a high style element.

The value of antiques, personal art collections, coin, stamp, and similar collections could presumably never be approximated except by sample studies in which respondents were requested to estimate their value. Unless such studies are carried through successfully, it might be preferable to exclude this type of asset, confining the total to the measurable components.

2 *Annual Data on Expenditures*

Annual surveys of family incomes and expenditures would serve many useful purposes, but they are beyond the scope of private research agencies, and there is little likelihood that funds for them will be voted by Congress in the near future. Until they are made at frequent intervals, if not annually, the Department of Commerce personal consumption expenditure series provides the sole basis for estimating the value of consumers' stocks that are not inventoried regularly.⁶¹ The advantages and limitations of both the Department of Commerce series and survey expenditure data have already been discussed. We merely call attention now to the desirability of special studies, repeated at intervals, of the sales of specific classes of consumer goods to institutions, hotels, restaurants, and other business establishments, in order to improve the division between consumer and nonconsumer use. Estimates of the value of consumers' tangible assets based on this series would be more accurate if certain subgroup classifications were narrowed and if the estimates of dealers' margins in the case of secondhand purchases could be improved. They would conform more closely to our definition of ownership units if land-

⁶¹ Unless special provision is made for covering institutional residents and military personnel stationed on posts, their expenditures would not be included in expenditure aggregates derived from survey data. They are included in the Department of Commerce series, and cannot be excluded unless special surveys are conducted to ascertain their nature and magnitude.

lords' expenditures on furniture and equipment for rental dwellings were estimated separately.

If sample survey data should become available at more or less regular intervals and expanded survey aggregates used to estimate the value of consumers' stocks, careful measurement of changes in the number of ownership units would be necessary to ensure correct totals. When aggregate expenditures are based on commodity flow data this is not necessary because changes in the size of the population are properly reflected.

3 *Price Information*

Prices to evaluate stocks of household appliances, etc. could be obtained either from consumers or from retail outlets. To evaluate new goods, consumers' price reports would have an advantage in that they would represent the average price level of goods purchased by consumers for personal use, whereas retailers' quotations would reflect purchasing by nonconsumers when it was frequent. Except for this factor, average prices of volume sellers in a representative sample of retail outlets would be equally satisfactory. Moreover, until survey data are collected periodically on a nationwide basis there is no alternative to collecting volume-seller price reports from retailers. Pricing by specification, more cumbersome and costly, does not seem appropriate.⁶²

Average prices for secondhand equipment of different ages could be computed from family surveys only if the samples were enormous, since purchases of secondhand goods are relatively infrequent. The secondhand market for household equipment, wheel goods, etc. is less active than the secondhand automobile market. It should be possible, however, to collect from dealers prices of selected household and personal goods of different ages. As noted above, for goods not generally sold secondhand, prices of equivalent new goods, adjusted as well as possible for the consumption that has taken place, must be

⁶² In any case, specifications would have to be developed from detailed information on the goods owned, which most consumers would be unable or unwilling to provide.

substituted. This will be necessary in only a few cases, however, if expenditure rather than inventory data are used to evaluate soft goods and durables with a relatively short life.

Volume-seller price reports share one limitation with consumer price reports in the case of goods more than one year old, i.e., because of differences in economic conditions at the date under consideration from those prevailing when the stocks were purchased, they may apply to a different quality level than that of the total stock of goods of similar ages in the hands of consumers. There is no practicable procedure by which to correct for this. More serious, but also impracticable to correct for, is the fact that the value of secondhand models passing through dealers' hands is probably higher than that of the total stock of similar models in consumers' hands, because the former are customarily reconditioned to some extent before they are offered for sale.

Government Component in the National Wealth

J. E. Reeve, et al

Bureau of the Budget
Division of Fiscal Analysis

Responsibility for major portions of the study was divided among the following staff members of the Division of Fiscal Analysis, Bureau of the Budget: federal claims and liabilities, J. E. Reeve and Susannah Eby; military physical assets, Michael S. March; federal nonmilitary physical assets, Wilbert G. Fritz, Laura Wendt Lokke, Joseph Mayer, and Margaret Beck; state and local government assets and liabilities, I. M. Labovitz, John W. Field, Joseph Mayer, and Elizabeth Owens. Several other staff members also provided considerable aid.

A SCOPE AND COVERAGE

Our aim is to explore the sources of data and the problems that arise in estimating the value of physical assets and claims owned by federal, state, and local governments together with their liabilities. Except for estimates of direct investments abroad, the geographic coverage is confined to the continental United States, excluding Alaska and all other noncontiguous areas. The estimates are in current prices on two dates, December 31, 1946 and 1939.¹

As far as the data permit, we included holdings of all federal, state, and local agencies that are either directly operated by government employees or in which the government holds a substantial equity interest. For example, the assets of Federal Reserve banks are included although all their stock is owned by private commercial and mutual savings banks.² Similarly, the wide array of trust funds administered by governmental agencies or appointees is included, even though for most such funds the beneficiaries are wholly or predominantly private citizens and institutions. But we omitted property in bankruptcy proceedings and estates controlled in some measure by probate courts, which presumably were included in other portions of the national wealth totals. The properties controlled by the Office of Alien Property (Justice Department) in 1946, another borderline case, are included in our totals, since the announced policy after World War II was not to return any property of Japanese or German nationals to their former alien enemy owners.³

¹ Only arbitrary over-all totals are included for military physical assets in 1939.

² The controlling facts are: (a) The 'owners' of Federal Reserve stock have only a minor say in Federal Reserve policies, which are determined by the Presidentially-appointed Board of Governors and by the Federal Open Market Committee of which it comprises the majority. (b) Dividend payments are limited by law to a 6 percent maximum. (c) In the event of withdrawal of any member bank or liquidation of the System, stockholders receive only their original investment; the balance eventually reverts to the Treasury.

³ "In the spring of 1945, the Secretary of State, the Secretary of the Treasury, and the Alien Property Custodian agreed that all property in the United States of hostile German and Japanese nationals should be vested in the Alien Property

Data for the federal government are shown separately from data for state and local governments. In general, the basis of allocation of assets between the levels of government is ownership, whether this is in fee or merely possession of long term easements. Indian lands and improvements held in trust by the federal government, however, are included with federal assets because of their special status, the large expenditures the federal government has made in connection therewith for improvements, and the continuing obligations it has assumed for protection and maintenance. Assets, such as federal-aid highways, which have been built or acquired by state or local governments with federal financial aid, are shown as state and local assets. Federal loans, such as those for rural electrification, are considered claims to wealth from the standpoint of the federal government; the physical assets are counted as assets of the debtor group, in this case usually private rural electrification cooperatives. The assets of the Unemployment Compensation Trust Fund, deposited in the federal treasury, are classified as federal, although legal title is in the several states.

The major classifications of assets and liabilities conform as far as possible to the general framework laid down for the studies in this volume. This imposed a degree of rigidity upon the governmental estimates, but the suggested classification was substantially adhered to, to permit consolidation with other estimates. In a few cases it was necessary to merge two or more types of claim, in others to subdivide in order to show meaningful groups. The definitions for some categories of physical assets are rather liberal.

Similarly, it was impracticable to make the suggested segregation between federal credit institutions and 'the rest of government'. Important credit institutions have substantial noncredit activities; e.g., the defense plant program of the Reconstruction Finance Corporation. On the other hand, many governmental agencies carry on relatively minor lend-

Custodian and that neither the property nor its proceeds should be returned to the former owners." *Terminal Report of the Office of Alien Property Custodian*, p. 3.

ing programs as a part of operations of a much broader scope; e.g., loans to the Indians by the Department of the Interior and purchases of securities of local housing authorities by the Federal Public Housing Authority (now the Public Housing Administration). Accordingly, it proved more convenient to group all federal government corporations (including mixed-ownership corporations) with certain other agencies that report their financial status quarterly to the Treasury pursuant to Budget-Treasury Regulation 3 under Executive Order 8512.

As far as possible, physical assets were divided into reproducible and nonreproducible. Federal, state, and local reproducible physical assets consist of a relatively small volume of housing, machinery, equipment, and inventory, but a relatively large volume of buildings and transportation and resource improvements. In the nonreproducible category, the federal government owns a large land area which is generally of low unit value except for the timber and minerals contained therein and for parcels used as building sites. State and local governments possess only a moderate share of the nation's land area: a large share of the land in city areas is highly valuable, but rural lands are predominantly of low value.

Nonreproducible physical assets comprise indigenous resources, such as land, forest growth, and minerals. But governments have made expenditures for conservation and development that contribute to the value of these resources as they now exist, and in which the improvements become so absorbed as to render their separation as a reproducible addition impossible. Although this merging prevents complete segregation of values for nonreproducible from reproducible assets, the estimates do give an approximation to the separate values. Forest lands contain the largest intermingling of reproducible with nonreproducible assets. In time and with care, forests are in fact completely reproducible. However, only the identifiable capital items, such as roads, trails, and fire towers, were separated as reproducible items. The same procedure was used for improvements of grazing lands and parks.

All mineral resources were classified as nonreproducible

assets. Since development of minerals is undertaken almost entirely by private concerns under lease agreements, permits, or land patents, governments possess almost none of the facilities necessary for this activity. Their investment in conjunction with mineral resources consists mostly of laboratories, demonstration plants, and structures which are properly regarded as reproducible assets.

B SUMMARY

1 *Government Assets and Liabilities*

Because of the exploratory character of the study, the emphasis upon concepts and methods, and the unavailability of reliable data on important areas, the estimates should be taken as only general orders of magnitude and used with caution. Even on the basis of the concepts used, the probable error is substantial and many important figures are arbitrary or token (intended primarily to indicate the existence of some items belonging in the designated category).⁴

In terms of depreciated replacement costs, physical assets of government agencies, as of December 31, 1946, were estimated to be \$198 billion. Liabilities, \$404 billion, however, were \$257 billion larger than claims. On balance, therefore, the obligations of federal, state, and local governments exceeded the assets by \$58 billion (Table 1).

⁴ The value of atomic energy construction and equipment was omitted from both military and nonmilitary assets.

Table 1
Assets and Liabilities of Federal, State and Local Governments
(millions of dollars)

	1946	1939	Net Change
Claims to wealth	147,486	54,729	92,757
Liabilities (& private equity)	404,105	118,843	285,262
Excess of liabilities	256,619	64,114	192,505
Reproducible physical assets	179,138	65,686	113,452
Nonreproducible physical assets	19,031	11,881	7,150
Total physical assets	198,169	77,567	120,602
Excess of physical assets & claims over liabilities	-58,450	13,453	-71,903

During the seven years 1939-46 the value of physical assets increased \$121 billion, largely because of federal expenditures for military assets, together with the war and postwar rise in price levels. Claims rose \$93 billion; two-thirds of this, however, represented merely increases in holdings of direct or fully guaranteed obligations of the federal government by federal, state, or local agencies. Liabilities increased most sharply, a total of \$285 billion, reflecting predominantly increases in public debt, currency in circulation, and the liabilities of trust funds (Table 2).

Table 2
Assets and Liabilities of Federal, State and Local Governments
1946 and 1939
(millions of dollars)

	FEDERAL GOVERNMENT		STATE & LOCAL	TOTAL GOVT.
	Non- military	Military		
D E C E M B E R 3 1, 1 9 4 6				
Claims to wealth	128,075		19,411	147,486
Currency in circulation	258		175	433
Demand and time deposits	5,441		6,811	12,252
Other claims receivable	116,658		12,275	128,933
Stocks	682		150	832
Direct investment abroad	5,036			5,036
Liabilities & proprietorships	381,875		22,230	404,105
Claims payable	381,329		22,230	403,559
Equities held by others	546			546
Excess of liabilities	253,800		2,819	256,619
Reproducible physical assets	42,025	77,903	59,210	179,138
Residential buildings	719		1,050	
Other structures	10,892	13,115	28,700	80,830
Roads and streets	654		25,700	
Machinery and equipment	780	3,350	3,150	7,280
Rolling stock	4,467	35,038	500	40,005
Inventory	1,524	26,400	100	28,024
Livestock	2		10	12
Monetary gold and silver	22,987			22,987
Nonreproducible physical assets	9,326	2,130	7,575	19,031
Land	4,926	2,130	6,925	13,981
Subsoil assets	3,400		550	3,950
Collectors' items	1,000		100	1,100
Total physical assets	51,351	80,033	66,785	198,169
Excess of physical assets & claims over liabilities	-122,416		63,966	-58,450

GOVERNMENT COMPONENT

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DECEMBER 31, 1939

Claims to wealth	43,225		11,504	54,729
Currency in circulation			90	
Demand and time deposits	2,269		3,504	5,863
Other claims receivable	39,136		7,785	46,921
Stocks	781		125	906
Direct investment abroad	1,039			1,039
Liabilities and proprietorships	95,838		23,005	118,843
Claims payable	95,445		23,005	118,450
Equities held by others	393			393
Excess of liabilities	52,613		11,501	64,114
Reproducible physical assets	24,761	4,800	36,125	65,686
Residential buildings	500		55	
Other structures	5,612		19,350	
Roads and streets	329		14,300	
Machinery and equipment	525	4,800	1,950	48,377
Rolling stock	225		400	
Inventory	271		60	
Livestock	2		10	12
Monetary gold and silver	17,297			17,297
Nonreproducible physical assets	6,546	200	5,135	11,881
Land	2,596	200	4,560	7,356
Subsoil assets	3,200		500	3,700
Collectors' items	750		75	825
Total physical assets	31,307	5,000	41,260	77,567
Excess of physical assets & claims over liabilities	-16,306		29,759	13,453

Details in Tables 3, 5, and 6.

Federal agencies on December 31, 1946 owned \$131 billion in physical assets, including \$80 billion in military and \$51 billion in nonmilitary assets. Total assets, including claims, however, were \$122 billion short of total liabilities.

State and local governments in 1946 had \$67 billion in physical assets, almost entirely civilian in character. Their liabilities and claims were almost in balance. As a result, their total assets exceeded their liabilities by \$64 billion.

The excess of liabilities over claims in 1946 almost equaled the outstanding public debt of the federal government. This chance equivalence arose from the approximate equality of all other claims and liabilities. To the extent that governmental agencies can levy and collect future taxes (or create legal tender money) to service their debts, there is no reason why their net liabilities should be limited by their physical assets.

For the economy as a whole—with the minor exception of claim relationships with foreigners—the excess of liabilities over claims of governmental agencies is offset by a corresponding excess of claims by others over their liabilities.

Claims on other governmental agencies, including deposits in the Treasury, accounted for \$100 billion of the \$147 billion in outstanding claims due federal, state, and local governments in 1946. Accrued tax claims, bank deposits, and loans and other credits were other major assets.

Apart from the public debt, the chief obligations owed the public were the present value of net claims of trust fund beneficiaries, the deposit liabilities of the Federal Reserve banks to member banks, Postal Savings deposits, and the outstanding currency.

Nonmilitary physical assets of the federal government, with a depreciated replacement value of over \$51 billion, consisted largely of monetary gold and silver, nonresidential structures, 'rolling stock', and land. Flood control, river and harbor, reclamation, power, and valley authority improvements, together with public buildings, made up most of the value of nonresidential structures. Ships owned by the Maritime Commission were the largest component in 'rolling stock'. Commercial forests and structural sites accounted for most of the value of federally-owned land; public domain and land held in trust for Indians were only a minor portion. Mineral resources and other subsoil assets under federal land were valued at \$3 billion.

All except \$11 billion of the \$67 billion in physical assets owned by state and local governments in 1946 consisted of construction assets. These included roads and streets valued at \$26 billion, nonresidential buildings at \$15 billion, and sewage disposal and water supply facilities at \$8 billion. Land owned by state and local governments represented predominantly (in terms of value) the sites for these and other construction assets.

Military assets of the federal government in the continental United States, which originally cost \$84 billion, had in 1946 an estimated depreciated replacement value of \$80 billion. Of

this, 'rolling stock' (ships, aircraft, and trucks) accounted for \$35 billion. Industrial plants, military and other structures were valued at \$13 billion, and machinery and equipment at \$3 billion. The inventory of other equipment and supplies—ordnance, combat vehicles, and other inventory—amounted to another \$26 billion. Land was only \$2 billion.

2 *Methods and Problems*

The accuracy of the various subsections of these totals varies widely, from precise figures for public debt and similar publicly-recorded liabilities and claims to rough guesses for many of the most important physical assets. Even more fundamental from the standpoint of the pilot character of this study, the concepts used in determining coverage and classification and particularly in valuing various types of assets are subject to serious controversy. The assumptions that had to be made do not in every instance represent a definitive judgment on what the answer ought to be. Further exploration of basic concepts and methods should accompany, or preferably precede, any major efforts to refine the figures.

In determining the range of assets and liabilities included, 'government' was defined rather broadly. Agencies that are nominally privately-owned (such as the Federal Reserve banks) were included if major incidents of equity or control were vested in governmental agencies or appointees. Assets of trust funds administered by governmental agencies or appointees were also included as government assets, but corresponding liabilities were shown on the assumption that the value of the actual or potential claims of beneficiaries in 1939 and in 1946 equaled the net value of all the assets of the funds at that time.

In valuing claims held by federal agencies, the reserves established by most agencies were accepted as reasonable, although some were probably more than required. The chief cases of possibly inadequate valuation reserves were foreign loans and direct investments abroad. Little evidence was available on the valuation reserves appropriate for state and local governments. Because of the large volume of intergovern-

mental claims on which the possibility of loss is remote, however, the probable error from this source for federal, state, and local governments as a whole is relatively small.

For most physical assets, current data on valuations were unavailable. Estimates, accordingly, were built up largely by cumulating historical data on expenditures with varying degrees of coverage. These cumulative historical costs in turn were adjusted by resort to heroic assumptions concerning rates of depreciation, obsolescence, supersession, salvage values, and changes in levels of reproduction costs. Questions arose also concerning the appropriateness of replacement costs when the property would not or should not be replaced.

The problem of valuing monetary gold and silver is apparently unique, since federal monetary policies determine the replacement cost of gold and dominate that of silver. As in the case of many other government assets, if the Treasury sold its gold and silver stocks the bottom would fall out of the market; the most reasonable assumption seemed to be that it would continue indefinitely to buy both at current or higher prices. In the present anomalous situation, the government determines directly the value of a portion of its own wealth—as well as indirectly, through its monetary and fiscal policies, the price levels at which all wealth, public and private, is valued.

Since a major part of the value of government-owned land consists of the sites of government structures, the formula used in allocating the portion of the total value of an installation represented by the site becomes of major importance in determining the value of government-owned land. A related question, left unresolved in this study, is whether the value added to or subtracted from adjacent lands by the dedication of rights-of-way for roads and streets is reflected entirely in the value of the adjacent property or should be included in whole or in part as an element in the value of the roads and streets themselves.

In valuing mineral resources, bold assumptions were required respecting the trend of requirements and production, the percentage of mineral value likely to accrue to the government, the expected value of unproved resources and discov-

eries, and the appropriate rate for discounting future returns. No attempt was made to allow for the value of resources not now in prospect or for a possible increase in the value of known resources of little present value. These problems of course arise in valuing any mineral resources, governmental or private.

Valuation of military assets raised especially difficult problems from the standpoint of both the availability of the data and the concepts involved. Coverage was very unequal among the services, and practically no information was available on the value of equipment or supplies (other than ships and aircraft) issued and in the possession of military personnel. The proper rates of depreciation and obsolescence were especially hard to determine. Replacement costs of equipment are particularly difficult to establish in uses in which the technology of warfare is advancing rapidly. Similarly, it makes a great deal of difference whether costs are based on the low levels of peacetime production or on the high levels and mass production methods of wartime. Most military assets except land have little more than scrap value for civilian use; hence, market considerations were given little weight.

Except for these residual physical assets, the victories in World War II and earlier wars were for the most part not treated as assets. Most of the wartime expenditures that caused the fivefold increase in the federal debt, in fact, were excluded as having been for current consumption, although from a national point of view it can be argued that they represent capital investment of major significance. Without a better crystal ball, however, it is impossible to judge whether the intangible assets exceeded the intangible liabilities—whether wars create conditions more favorable for future peace or sow the seeds for later conflicts. Like police protection, war expenditures can at least be said to help preserve existing wealth from enemy destruction or appropriation.

Some government-owned property is on the borderline of economic wealth in the sense that it may represent in some locations an artificial duplication of facilities that elsewhere

are provided by nature with little or no outlay of labor and materials. Is the mountain road worth more than the prairie road because it costs more to build? Is the artificial canal worth more than the natural river channel? In these estimates an affirmative answer was tentatively assumed.

A potential source of controversy over the selection of a basis for valuing some types of government property arises from the fact that ownership is vested in the public. Actually, there are many publics. In establishing tax and service charge policies for such facilities as highways and airports (as well as liquor monopolies and other public service enterprises), an essential ingredient of the inquiry is the distinction between the users of the service and the general taxpaying public. For purposes of the estimates, it was assumed that monopoly pricing is not desirable government practice and that, consequently, the earning value represented by any such element in the charges for service should not be capitalized as a governmental asset.

Closely related is another question: if a governmental organization can produce certain commodities or fee-commanding services that yield a profit at a non-monopolistic price, what considerations govern the choice to be made between price reduction, general tax reduction, or the expansion of other services? In such a case, it is doubtful that depreciated replacement cost adequately measures the value of the physical assets involved.

Future commitments and contingencies raise important problems in assessing the claims and liabilities of governments. If the valuation of private property discounts future tax liabilities, should not government likewise include as a claim the discounted present value of such future tax receipts? If government is committed to the payment of pensions, if it guarantees private lenders against loss, should not its liabilities include an allowance for the discounted value of the ultimate payments? The estimates exclude all allowance for future tax receipts when the liability has not yet accrued and for future commitments or contingencies—except to the extent that funds have already been accumulated to meet them.

C CLAIMS AND LIABILITIES

The federal, state and local governments and their constituent agencies in 1946 had claims on one another and on the rest of the economy amounting to an estimated \$147 billion after valuation reserves. The corresponding liabilities and book value of private equities in governmental agencies were nearly three times as high, \$404 billion. Thus, on balance, governmental agencies owed \$257 billion more than they were owed. In 1939 the estimated liabilities and private equities, \$119 billion, exceeded claims, \$55 billion, by \$64 billion (Table 3).

This net excess of obligations over claims by governmental agencies is roughly offset by an excess of claims over liabilities by all other groups. In fact, if the net excess of claims against foreigners were eliminated from both, the two would be exactly equal. Accordingly, with the exception of its influence on claim relationships with foreigners, the volume of governmental claims and liabilities has no direct influence on the net total of national wealth.

The ability to create both claims and liabilities of this magnitude, however, has had a profound, though indirect, influence on both the extent and the direction of changes in national wealth. To take the most obvious example, the huge borrowing and related currency expansion operations during World War II were largely used to finance current war expenditures together with military installations, equipment, etc., rather than to construct the types of physical assets most useful in times of peace. These operations caused a substantial rise in the net liabilities of the federal government, increased the market valuations of all wealth, and helped to create a pattern of wealth and income relationships that will have continuing influence on the flow of income and the creation of wealth.

On a gross basis (before valuation reserves and including intergovernmental claims), the Federal Reserve banks, the Treasury Department, and federal government trust funds in 1946 held an estimated \$104 billion in claims, or over 70 percent of all claims held by governmental agencies. If holdings of

Table 3
Claims * and Liabilities of Federal, State and Local Governments, 1946 and 1939
(millions of dollars)

	F E D E R A L G O V E R N M E N T					STATE & LOCAL	TOTAL GOVT.
	Corp & credit agencies	Treas.	Federal Reserve banks	Trust accs.	All other		
Claims to wealth	13,109	32,452	44,972	26,398	11,144	19,411	147,486
Currency in circulation						175	433
Demand & time deposits in							
Banks	232	2,761		194	123	6,311	9,863
Treasury & other fed. agencies	1,456	682			251	2,389	2,389
Other claims receivable	11,162	28,685	44,972	26,204	5,635	12,275	128,933
Accrued tax claims		15,500				3,100	18,600
Accrued interest receivable	6		27	250	15	25	323
U.S. govt. securities	1,873		23,350	25,339	3,206	6,200	60,468
Guaranteed obligations of fed. agencies	9	10,693				10,702	10,702
Obligations of state & local govt.	460					460	2,860
Gold certificates & similar claims		265	18,813		1,800	20,878	20,878
Loans	5,331	854	164	115		6,964	6,964
All other	2,983	1,373	2,618		614	550	8,138
Stocks	223	324			135	150	832
Direct investments abroad	36				5,000		5,036
Liabilities & proprietorships	18,220	288,861	44,543	26,398	3,853	22,230	404,105
Claims payable	17,861	288,861	44,356	26,398	3,853	22,230	403,559
Accrued tax refunds		2,700				10	2,710
Accrued interest payable	6	1,200			95	70	1,371
Accrued wages & salaries		760				125	885
Public debt, direct		258,404				16,200	274,604
Guaranteed debt of fed. agencies	10,963					10,963	10,963
Claims payable in gold		20,286				20,286	20,286
Currency in circulation		4,280	24,672			28,952	28,952
All other claims payable	6,892	1,251	19,684	26,398	3,758	5,325	63,788
Equities held by others	359		187				546
Excess of claims over liabilities	-5,111	-256,409	429		7,291	-2,819	-256,619

	D E C E M B E R 3 1			1 9 3 9			
Claims to wealth	10,691	4,677	18,986	4,690	4,181	49,225	11,504
Currency in circulation					4		90
Demand & time deposits in							
Banks	96	906			53	1,059	3,504
Treasury & other fed. agencies	364	673		79	94	1,210	1,210
Other claims receivable	9,451	3,058	18,986	4,611	3,030	39,136	7,785
Accrued tax claims		2,700				2,700	3,250
Accrued interest receivable	90	1	9	58	7	165	10
U.S. govt. securities	758		2,484	4,356	1,058	8,656	400
Guaranteed obligations of fed. agencies	138	101			146	885	9,441
Obligations of state & local govt.	183					183	3,883
Gold certificates & similar claims		169	15,558		1,900	17,527	17,327
Loans	7,075	66	22	153		7,316	425
All other	1,207	21	913	44	19	2,204	9,945
Stocks	741	40				781	906
Direct investments abroad	39				1,000	1,039	1,039
Liabilities & proprietorships							
Claims payable	3,314	62,296	18,941	4,690	1,597	95,833	23,005
Accrued tax refunds	8,057	62,296	18,805	4,690	1,597	95,445	23,005
Accrued interest payable		80				80	10
Accrued wages & salaries	52	250			36	338	80
Public debt, direct		150				150	240
Guaranteed debt of fed. agencies	5,704	41,547				41,547	19,600
Claims payable in gold						5,704	61,147
Currency in circulation		17,078	4,912			17,078	5,704
All other claims payable	2,301	2,686	13,893	4,690	1,561	7,598	17,078
Equities held by others	257	505				22,950	7,598
Excess of claims over liabilities	2,377	-57,619	136			393	26,175
			45		2,584	-52,613	393
							-11,501
							-64,114

* After valuation reserves.

government or government-guaranteed securities, gold certificates, and other interagency assets are eliminated, however, only the Treasury Department, the state and local governments, and the lending institutions included in government corporations and credit agencies had a significant volume of claims, and these were fairly well scattered among the various debtor groups.

1 *Basis of Valuation*

Most claims held by federal, state, and local governments can be evaluated with reasonable accuracy by applying to the unpaid balance of principal and interest of the original obligation a relatively minor valuation reserve based upon experience. Most claims, as noted above, are intergovernmental. To the extent that they are direct or indirect claims on the federal government—or on gold held by it—no valuation reserve whatever was assumed.

In the case of loans receivable and similar claims of federal government corporations and credit agencies, valuation reserves already set up were used, since most seemed adequate to cover all probable losses; indeed, in many cases, assets are probably undervalued. The chief possible overvaluation was in foreign loans, where political factors are so dominant that no useful purpose would be served by setting up reserves in addition to those used by the agencies themselves. All World War I debts, except Finland's, however, were eliminated as uncollectible. No allowance whatever was made for unsettled Lend-Lease commitments for World War II.

2 *Limitations of Data*

The chief conceptual problem in this portion of the study was where to draw the line between claims and liabilities firm enough to deserve inclusion and claims and commitments conditional and contingent enough to warrant exclusion. The items included were defined rather narrowly.

From a broad point of view it could be argued, for example, that the claims owned by governments should include not only

the claims to tax payments already accrued (and included in our estimates), but also the present discounted value of probable future tax levies. From the same point of view, the present value of many long term commitments of governments, such as interest on the public debt and veterans' pensions, should be included in their liabilities. This position is fortified by the recognized fact that the value of important types of private wealth is determined in part by capitalizing the average net income expectations—which in turn depend upon anticipation of the future levels of particular types of government tax levies and expenditures.

Moreover, in recent decades, the federal government in particular has entered into an increasingly wide range of conditional or contingent commitments.⁵ In the last few years federal agencies at all times have had several billions of dollars in unliquidated obligations incurred against appropriations and contract authorizations, which were almost certain to result later in expenditures; only part of these are reflected in the estimates. Similarly, government corporations and credit agencies normally have substantial commitments outstanding (not reflected in the estimates) to make disbursements on loans and for other purposes, most of which will result in expenditures.

Larger but more remote contingent liabilities and commitments are involved in federal guarantees and insurance of private loans, and federal insurance of bank deposits and savings and loan share accounts. In all these cases the government's liability becomes actual only if and to the extent that underlying assets prove inadequate to protect the insured from loss. Moreover, since such assets often consist of government securities, much double-counting would be involved in adding these contingent liabilities to totals that already include all direct obligations of the federal government.

⁵ Fairly comprehensive tabulations of such major commitments and contingencies for the federal government have been included in recent years in Congressional appropriation hearings, e.g., House of Representatives, *Hearings before the Subcommittee of the Committee on Appropriations on the Independent Offices Appropriations Bill for 1948*, Part I, p. 987.

The estimates in this study, in general, include only claims and liabilities that either had already accrued or would accrue in specific determinable amounts at definite future times. Claims and liabilities of the various types of social insurance, veterans' life insurance, and retirement systems are shown only to the extent that specific assets had been set up in a fund. As a result the coverage varies from case to case depending upon the adequacy of the present assets to meet actuarial standards. The deficiency of the Civil Service Retirement Fund on this basis in 1946, for example, was several billion dollars. In the case of military retirement and veterans' pensions, which were unfunded, the current value of future liabilities was undoubtedly even greater.

Apart from limitations arising from these conceptual problems, the chief shortcomings of the data arise from the unavailability of reliable data on certain important components. The arbitrary figures on direct investment abroad and the token figures on certain state and local government items reflect these basic weaknesses. In some cases, e.g., accruals of military pay and holdings of foreign currency by disbursing officers, significant potential items were excluded for lack of time to dig out the necessary information.

In general, interagency claims and liabilities were included except when the basic source material excluded them. While a good case could be made for consolidating all federal interagency items, the time available did not permit the attempt. Hence our financial statements are combined rather than consolidated statements.

Whenever possible, the data were based on government accounts. For some items, however, e.g., tax claims and bank deposits, it was necessary to use material built up at least partly from other sources. From these items the 'float' of payments in transit was not entirely removed.

3 *Claims by Type*

Currency. This category is largely a residual since it includes only currency and coin outside the Treasury and Federal Re-

serve banks. Currency held by most other federal agencies could not be segregated from deposits. Likewise, currency held by state and local governments could be estimated only roughly.

Demand and time deposits. Deposits of governmental agencies in commercial and mutual savings banks at the end of 1946 amounted to \$9,863 million, divided between deposits of federal agencies, \$3,052 million, and those of state and local governments, \$6,811 million. In addition federal agencies had \$2,389 million on deposit with the Treasury, the Federal Reserve banks, and with certain government corporations.

Other claims receivable. Since, in many cases, it was impractical to segregate short and long term claims, they were combined in our analysis. The aggregate, \$129 billion in 1946 and \$47 billion in 1939, was divided into six major types.

Accrued tax claims totaled an estimated \$18,600 million in 1946. Despite the pay-as-you-earn provisions of the federal personal income tax instituted during the war, the accrued tax claims of the federal government, \$15,500 million, were five times as high as the 1939 estimate, \$2,700 million. Corporation taxes and personal income taxes accounted for most of the 1946 total. State and local accrued tax claims of \$3,100 million in 1946 consisted primarily of unpaid property taxes, including relatively small amounts of delinquent taxes.

Accrued interest receivable amounted to \$323 million in 1946. Most of the \$298 million accrued by federal agencies represented accruals on government securities held by trust accounts.

Investments in direct obligations of the federal government were estimated to be \$60,468 million in 1946, including \$6,200 million held by state and local governments. Most of these securities were held by federal trust funds and by Federal Reserve banks. In addition, the Treasury Department and federal agencies held \$10,702 million in guaranteed obligations of federal corporations and agencies. State and local governments and a few federal agencies (chiefly the Federal Public Housing Authority and the Reconstruction Finance Corporation) held

\$2,860 million in obligations of state and local governments. In 1946 these types of government security totaled \$74 billion; in 1939, \$13 billion.

Gold certificates and similar claims not included in money in circulation—gold certificates held as reserve for Federal Reserve notes and for deposits of member banks in Federal Reserve banks, the unused \$1,800 million in gold claims of the Exchange Stabilization Fund, the reserve of \$156 million behind outstanding United States notes, the Federal Reserve notes held by the Treasury, and the Federal Reserve notes and other currency held by the Federal Reserve banks—amounted to \$20,878 million in 1946, all held by federal agencies.

Outstanding loans of federal agencies in 1946 amounted to \$7,447 million on a gross basis, or \$6,964 million after valuation reserves. Except for the Treasury loan to the United Kingdom, at that time \$800 million, most of the loans were made by more specialized government corporations and credit agencies, chiefly the Reconstruction Finance Corporation, the Export-Import Bank, the Federal Land banks, the Home Owners' Loan Corporation, the Rural Electrification Administration, and the Farmers' Home Administration. The 1939 total, \$7,316 million (comparable as far as feasible after valuation reserves), was not far different, but farm and home mortgage loans constituted a much larger part, and foreign loans and rural electrification loans a much smaller. As already noted, with the minor exception of the \$8 million in outstanding balances on the loan to Finland, no allowance was made on either a gross or a net basis for outstanding debts of foreign governments arising from World War I, amounting on November 15, 1946 to \$15,064 million. The totals excluded also outstanding guarantees of private loans, estimated to exceed \$5,800 million in 1946, as well as substantial undisbursed commitments to make direct loans.

'All other' claims in 1946 came to an estimated \$8,138 million after valuation reserves, about three times the 1939 total. The largest component was the \$2,983 million of federal corporations and credit agencies (after valuation reserves of \$54

million), consisting of a wide variety of receivables, accrued assets, advances to contractors and agents, deferred and undistributed assets, and miscellaneous assets. Uncollected items and other assets of Federal Reserve banks accounted for another \$2,618 million. Receivables such as Lend-Lease credits and property credits arising from sales of war surpluses were the other chief federal claims. Miscellaneous claims of state and local governments totaled an estimated \$550 million, mainly represented by nongovernmental bonds and mortgage investments held by public endowment, trust and sinking funds, and by publicly-owned enterprises.

Stocks. Stock holdings in private and foreign enterprises in 1946 amounted to an estimated \$832 million. Stocks owned by federal agencies involved an initial gross investment of \$715 million, and were valued on December 31, 1946 at \$682 million. Most of the federal total consisted of RFC investments in preferred stock and capital notes of banks, smaller investments by other corporations in production credit association and savings and loan association shares. Treasury investments in the International Bank for Reconstruction and Development and the International Monetary Fund, and an equity interest of \$135 million by the Alien Property Custodian (now the Office of Alien Property) in vested business enterprises and other vested assets (valued as of October 1, 1946). State and local holdings represented chiefly rough estimates of stocks held in endowment funds of state universities.

Direct investment abroad. The net value of physical assets in United States possessions or in foreign countries was arbitrarily estimated to be \$5 billion in 1946; \$1 billion in 1939. All except negligible amounts were held by federal agencies, and the majority were in military installations abroad.

4 *Liabilities by Type*

Claims payable. Outstanding claims owed by government agencies totaled an estimated \$404 billion, including \$382 billion by federal agencies and \$22 billion by state and local agencies. In 1939 total claims payable were \$119 billion, in-

cluding \$96 billion for federal agencies and \$23 billion for state and local governments.

Of the \$2,710 million in accrued tax refunds in 1946, almost exclusively by the federal government, \$1,700 million represents refunds of personal taxes and \$1,000 million corporation refunds. The figures were based upon an assumed lag averaging more than 15 months between the original overpayment and the subsequent refund. In 1939 such liabilities were only \$90 million.

Accrued interest payable was estimated to be \$1,371 million (including \$70 million by state and local governments) in 1946; \$418 million in 1939. The federal components represented roughly three months' accruals. Accrued wages and salaries were estimated to be \$885 million in 1946 and \$240 million in 1939. No allowance was made for accrued military pay in either year.

Direct public debt obligations in 1946 amounted to \$274,604 million, including \$16,200 million gross debt of state and local public bodies. Debt of governmental agencies fully guaranteed by the federal government accounted for another \$10,963 million. The sharp rise in federal obligations accounted for the entire increase from the 1939 total of direct and guaranteed debt, \$66,851 million. The federal total in 1946 excluded \$745 million in United States notes, national bank notes, Federal Reserve bank notes, and other currency included under currency in circulation.

Claims payable in gold, \$20,286 million in 1946, included gold certificates used as security for Federal Reserve notes, certificates held by the Exchange Stabilization Fund, and certificates used as reserve for United States notes. They excluded the \$49 million in gold certificates still held by the public and counted in currency in circulation.

Of the \$28,952 million currency in circulation in 1946, \$24,672 million represented Federal Reserve notes. Obligations not only of the Reserve banks but also of the United States, they are receivable for taxes and redeemable in lawful

money. The remaining \$4,280 million consisted chiefly of silver certificates and a wide variety of other Treasury currency and coins. In 1939 currency in circulation totaled \$7,598 million.

Other claims payable amounted to \$63,788 million in 1946, \$26,175 million in 1939. The largest components in the federal total, \$57,963 million, were the deposit and other liabilities of the Federal Reserve banks, the claims of future beneficiaries of federal trust funds, the sizable miscellaneous liabilities of federal corporations and related agencies, the deposit liabilities of the Postal Savings System, and the liabilities to the Indians for the physical assets held in trust for them. Miscellaneous claims owed by state and local governments, estimated to be \$5,825 million, consisted primarily of claims of future beneficiaries of trust funds. In the case of government trust funds, at all levels of government, the present value of claims of beneficiaries was arbitrarily assumed to equal the entire net assets of the funds. As noted above, the probable liability is considerably larger.

Equities held by others. The book value of the equity of private institutions and individuals in federal agencies, \$546 million in 1946, included privately-held Federal Reserve bank stock as well as private holdings in Federal Land banks, Federal Home Loan banks, and banks for cooperatives. It excluded stock of the Federal Deposit Insurance Corporation held by the Federal Reserve banks.

5 *Claims and Stocks, by Obligor Groups*

To promote consistency in treating claim and liability relationships of governmental agencies and the rest of the economy, both the claims (excluding currency and deposits) and the stock held by governmental agencies in 1946 (Table 3) were classified by major obligor groups (Table 4). For federal agencies gross valuations, before valuation reserves, were used rather than the net valuations used in Table 3; net valuations, however, were used for claims and stock owned by state and local governments.

Table 4
Claim * and Liability Relations of Federal, State and Local Governments, December 31, 1946
(millions of dollars)

	F E D E R A L G O V E R N M E N T					STATE & LOCAL	TOTAL GOVT.
	Corp. & credit agencies	Treas.	Federal Reserve banks	Trust accts.	All other		
<i>Other claims receivable owed by</i>							
Credit institutions							
Private	583	500	2,613			85	3,781
Federal government	1,775	10,738				1	12,514
Public utilities	153	1,022				600	1,775
Manufacturing & trade	270	8,600			391	1,400	10,661
Mining concerns	5	200				65	270
Farms	1,787	600				210	2,597
Foreigners	1,361	1,999	148		185	5	3,698
Collectives							
Private nonprofit	716					5	721
Rest of government	2,611	293	42,199	26,089	5,006	8,624	84,822
Households	685	4,000		115		920	5,720
Others & unclassified	1,749	637	12		53	360	2,811
Total	11,695	28,589	44,972	26,204	5,635	12,275	129,370
<i>Stocks issued by</i>							
Private credit institutions	254	1				5	260
Public utilities	2					80	82
Manufacturing & trade corp.					135	25	160
Foreign corporations		323					323
Unclassified						40	40
Total	256	324			135	150	865

* Before valuation reserves, except for claims of state and local governments.

Other claims receivable, by debtor groups. Gross claims receivable (excluding currency and deposits) exceeded \$129 billion in 1946. Over \$97 billion represented claims owed by other governmental agencies (including claims owed by federal credit institutions). Over half of the remaining claims were for unpaid taxes; hence, the tax item dominated many of the individual components.

Claims on private credit institutions totaled \$3,781 million, chiefly uncollected items of the Federal Reserve banks, obligations of savings and loan associations, and production credit associations held by government corporations, and unpaid taxes. Claims against public utilities were \$1,775 million, consisting mainly of estimated taxes payable, secondarily, of government loans to railroads. Similarly, claims of \$10,661 million owed by manufacturing and trade consisted predominantly of estimated taxes payable, secondarily, of obligations arising from sales of surplus property and corporation loans to business. Apart from small Reconstruction Finance Corporation loans, the only major obligations of mining concerns to governments were their tax liabilities.

Claims on farmers, \$2,597 million, consisted primarily of loans by the Federal Land banks, the Farmers' Home Administration, and other government corporations, secondarily, of outstanding personal and corporate tax liabilities. Loans to rural electrification cooperatives⁶ and other farmers' cooperatives largely accounted for the \$721 million in claims against private nonprofit institutions. Foreigners owed governmental units an estimated \$3,698 million, representing chiefly loans, Lend-Lease termination credits, and surplus property credits.

Total claims on households (excluding unincorporated businesses and farmers), \$5,720 million, represented primarily estimated tax liabilities, secondarily, loans by the Home Owners' Loan Corporation and other government corporations. Finally, the \$2,811 million in claims on other obligors and unclassified

⁶ All REA loans were included in this item, although a small percentage were made to public power districts and other governmental units.

claims was concentrated largely in accounts and notes receivable, advances to contractors and agents, undistributed charges, and other miscellaneous assets of government corporations and credit agencies.

Stock, by issuer. The gross value of stock held by governmental agencies was estimated to be \$865 million, concentrated almost entirely in stock issued by four types of issuer. Investments in private credit institutions, \$260 million, represented chiefly preferred stock and capital notes of banks, secondarily, shares in savings and loan associations held by federal corporations. Public utility stock, \$82 million, consisted almost entirely of an arbitrary estimate of holdings by state and local governmental units. The equity, about \$135 million, in domestic business enterprises held by the Office of Alien Property as trustee was allocated in full to manufacturing and trade. By the end of 1946 the Treasury Department had invested \$323 million in the International Bank for Reconstruction and Development and the International Monetary Fund; both were classified as foreign corporations.

D PHYSICAL ASSETS, EXCLUDING MILITARY

Physical assets of federal, state and local governments, other than military assets, are estimated to have had a depreciated replacement value of \$118 billion at the end of 1946. Federal government assets were \$51 billion; state and local government assets, \$67 billion (Table 5). Of total assets estimated for 1939, \$73 billion, over \$31 billion belonged to the federal government and \$41 billion to state and local units.

Civilian physical assets of governmental agencies represent predominantly structures and roads and streets. Monetary gold and silver valued at \$23 billion in 1946 was the largest other type classified as a reproducible asset. Land and other non-reproducible assets were about \$17 billion.

The following discussion emphasizes the methods pursued and problems encountered in constructing estimates for the

Table 5
Physical Assets of Federal, State and Local Governments,
excluding Military, 1946 and 1939
(millions of dollars)

	December 31, 1946			December 31, 1939		
	Federal	State & Local	Total Govt.	Federal	State & Local	Total Govt.
Total physical assets	51,351	66,785	118,136	31,307	41,260	72,567
Reproducible	42,025	59,210	101,235	24,761	36,125	60,886
Residential buildings	719	1,050	1,769	500	55	555
Other structures	10,892	28,700	39,592	5,612	19,350	24,962
Nonresidential	1,978	15,400	17,378	1,311	11,100	12,411
Other improvements	8,914	13,300	22,214	4,301	8,250	12,551
Roads & streets	654	25,700	26,354	329	14,300	14,629
Machinery & equipment	780	3,150	3,930	525	1,950	2,475
Rolling stock	4,467	500	4,967	225	400	625
Inventory	1,524	100	1,624	271	60	331
Livestock	2	10	12	2	10	12
Monetary gold & silver	22,987		22,987	17,297		17,297
Nonreproducible	9,326	7,575	16,901	6,546	5,135	11,681
Land	4,926	6,925	11,851	2,596	4,560	7,156
Res sites, acquired	307	150	457	104	10	114
Sites, other structures	1,334	5,350	6,684	662	3,570	4,232
Forests, parks, & unimproved lands	3,285	1,425	4,710	1,330	980	2,310
Subsoil assets	3,400	550	3,950	3,200	500	3,700
Collectors' items	1,000	100	1,100	750	75	825

federal government. Similar methods were used for state and local governments, but in many instances the data were less adequate.

1 *Basis of Valuation*

The valuation of government physical assets for the purpose of measuring wealth presents a special problem, since most are noncommercial and market value has little, if any, meaning. The value of most government assets for purposes other than those served by the governmental body itself is so low as to be of questionable significance as a measure of wealth.

This study proceeded on the premise that government assets have value independent of the value they add to (or subtract from) private assets. Even a cursory review of the inventories of government-owned property quickly suggests that acquisition does not necessarily and inevitably take things outside the concept of economic wealth. Nor did it seem appropriate to appraise most government assets at the value they would possess if converted to private use. Such a concept is valid only for

assets that have a governmental use approximating a private use. Forests, range lands, and the roads that serve almost exclusively a particular private owner may be of this type. However, even in these instances, there are some marked dissimilarities. In managing the national forests, for example, the federal government gives weight to secondary objectives, such as recreation, and to long term objectives, such as conservation, far more than does a private forest owner, and such special factors should be taken into account in estimating the value. The concept is even more difficult to apply to the evaluation of assets for which analogies do not occur in the competitive market place.

The concept of government wealth applied in this study assumes that government assets generally possess economic value whenever they make it possible for the government to serve society under the customs and legal system prevailing. It is basically little different from that underlying private property, where the value is also dependent on usefulness within an accepted framework of custom and law.

The value of all assets, public or private, depends also on the specific functions they can perform. Government assets, in many cases, perform such highly specialized functions as to preclude using their value for an alternative purpose as a general measure of their value. Nevertheless, it would be inconsistent with the measurement of private wealth to adopt the absolute maximum of valuation, since, if market value is the basis, the objective is not to determine what the highest possible value to a single user may be but rather to determine how far another potential user is willing to go in driving up the price that must be paid by the successful purchaser. There undoubtedly are instances in which the value of assets in governmental use is lower than their value would be if they were in private use. Such instances are, however, believed to be exceptional.

In general, government wealth must be valued on the assumption that the assets are essential to the provision of governmental services and that these services, by and large, are worth what they cost. Certain government property has been

in public possession since the creation of the governing body. The historic action of the federal government in divesting itself of most of the public domain may be interpreted as reflecting a series of decisions that the property would have a higher value in private ownership. Fortunately, this study does not need to appraise the correctness of these decisions. But it does need some evaluation of the property retained, and this raises questions about whether disposals have reached or passed the point at which values in private ownership can be applied in evaluating government assets.

Assets that have been purchased may be subjected to a similar test, although there is usually little doubt—at least at the time of acquisition—that a higher value would be put on them in governmental use than in any competitive private use. Of course, if a private individual or group were to possess the property under conditions of monopoly, they might be able to exact revenue from the public at such a level that the capitalized value of the property would be far above any value that would be considered reasonable in government ownership. But unregulated monopoly is at least exceptional in a competitive enterprise system, if it is not, in fact, incompatible with that system; and the net monopoly gains are, in a strict sense, a return on a special privilege bestowed by the action or inaction of government. It would be anomalous to credit government itself with the value of such monopoly privileges just because it possesses the physical means and the legal powers (as in the case of atomic energy production or state liquor stores) to establish a monopoly position. Indeed, it is almost a contradiction in terms to speak of an unregulated government-owned monopoly.

The value of purchased government assets depends upon the quality of the decisions made by the authorities. These decisions may be correct or incorrect, much the same as the decisions of private individuals may or may not be well advised in acquiring property. Government assets may be regarded, perhaps without excessive error in most instances, as having an average value at the time of their original acquisition equal to

their cost. Subsequently, their value may increase or decrease, depending upon the function they can perform in the light of the physical deterioration of the property, the availability of alternative means for providing the services, and the public interest in or demand for such services. There might be either 'unearned increment' or functional disability. A meticulous study of government wealth would require that the factors of increase and decrease be appraised for each particular type of property. Such a study would require a staff larger than has ever been assembled to study even a selected major segment of wealth. The Interstate Commerce Commission, for example, has never been able to complete a detailed valuation of the nation's railroads. It has been necessary, as a practical matter, to deal with major groups of governmental properties and to apply such over-all methods of estimation as will give reasonably useful results.

Several methods were used for estimating the value of physical assets in this study, the choice depending on the applicability of each method to particular groups of property and the availability of information. The estimates are exceedingly rough, suggesting orders of magnitude rather than measures. For government land that does not have a highly specialized use, competitive value was used as far as feasible. When data were available on cumulative expenditures, historical cost was used as an approach to value. When the assets were not purchased by the government or when information on acquisition cost was not available, reproduction cost depreciated or, when appropriate, market value was used. Whenever investment was the starting point, adjustments were made to allow for depreciation, obsolescence, salvage, and changes in price.

Government surplus property is a special case, since it has undergone such a radical change of function that neither historical nor reproduction cost can measure its value. The subsequent actual sales realization or the expected realization was used. Short-lived government property was necessarily valued in current market prices, since past expenditures gave little or no clue to the value of the property still remaining.

2 *Limitations of Data*

The methods of valuation have necessarily varied between major types of physical assets as well as between agencies. Engineering appraisals are virtually non-existent. For agencies issuing business-type balance sheets, these records were accepted as guides to the value of the property. Otherwise, the values were derived in the main from expenditure records or, as in the cases of machinery, equipment, and inventories, from scattered surveys. The guides to value were specially questionable for the public domain, mineral resources, and collectors' items. When reproducible and nonreproducible assets were mingled, e.g., in nonresidential buildings, the allocation was based on fragmentary information.

3 *Reproducible Assets*

Construction assets. Long term nonmilitary improvements owned by governmental agencies include residential buildings, other structures, and roads and streets. These improvements, plus surplus real property and emergency public works, had an estimated total depreciated replacement value on December 31, 1946 of \$68 billion. State and local governments accounted for \$55 billion. In 1939, the total was \$40 billion, of which state and local governments owned \$34 billion.

Expenditure records for federal construction and other long term improvements were assembled back to the fiscal year 1791, by major groups according to purpose. First, total or gross cost for each group was calculated. Second, the cost of acquired sites was subtracted, leaving the cost of improvements. Third, the cost of the improvements was adjusted to allow for depreciation, obsolescence, and supersession. Fourth, the 'depreciated' cost of the improvements was adjusted for changes in price to get final valuations as of the end of 1939 and 1946.

The calculations for depreciation, obsolescence, and supersession were intended to measure 'economic depreciation', not to follow the conservative private business practice of writing off the value of property faster than it declined in

economic usefulness. The depreciated values do not necessarily reflect the economic usefulness of the property for the years concerned. If possible, the depreciation schedules for each component of government wealth should be adapted to the particular characteristics and usefulness of each major constituent. Such a survey would subdivide even individual pieces of property according to the depreciation applicable to each segment. Some depreciation schedules would doubtless show a fast rate in the early life of the property and a slower rate in the later years; others might show the reverse. Allowances would have to be made also for the salvage value of each component which might be large in some instances, and zero or even negative in others. The depreciation schedule for each component would be difficult to predict and the refinement would not be justified. Moreover, the data made it necessary to apply calculations to groups of properties with a mixture of components having varying lengths of life and types of depreciation curve.

The method we followed in adjusting for economic depreciation utilizes two straight lines: one to represent the depreciation rate for the combined short- and long-lived components in the early years of the asset; the other to represent the slower rate for the surviving components in the later years. This resembles more closely a parabolic curve, in which salvage is assumed to be reabsorbed and amortized within the general category of similar assets, than it does a single straight line over the average life with an adjustment for salvage at the end.

The application of this method can be illustrated in connection with the projects undertaken by the federal government for the improvement of river valleys. The major storage dams are likely to have a useful life of more than a century; navigation locks, power houses, and irrigation works for the most part are likely to have a substantially shorter life. A relatively rapid depreciation schedule was applied to part of the investment and a slower schedule for the remainder. Since, on the average, a large part of the total expenditure was on dams, the transition from the faster rate of depreciation to the

slower rate was relatively high on the curve. Each class of property was thus analyzed as a special case, and depreciation curves were applied according to the characteristics involved (see the Appendix for details).

Property held for disposal. The war brought into being a class of assets that required special treatment. Created to serve the federal government during the war, it no longer serves that purpose. Because the property has lost most of its original functional value, it is revalued in terms of peacetime markets. Data of the War Assets Administration, the predominant surplus disposal agency, were used.

In the case of real property, the original cost of property declared surplus but not disposed of by December 31, 1946 was reduced by applying the actual sales realization on disposals through September 1947. A minor addition was made to allow for surplus property held for disposal by other agencies. Separate estimates, derived by similar procedures, were prepared for rolling stock, including ships sold or to be sold by the Maritime Commission, and for inventories of goods.

In December 1946 almost all the property held for disposal was of these types. In December 1939 it consisted largely of farm property held by the Federal Land banks and the Federal Farm Mortgage Corporation and property held by the Reconstruction Finance Corporation. In the case of the farm property a relatively large percentage of the value was assumed to be in land. Some farm housing was included, but no urban housing held for disposal. Property held by the Home Owners' Loan Corporation for disposal was included in residential buildings.

Emergency public works. A special problem arose in evaluating some of the public works undertaken as depression measures when relief to the unemployed was an element in the construction programs. The cost of the project ordinarily exceeded competitive costs. In view of these considerations, expenditures for state and local relief construction, including those financed from federal funds, were discounted approximately one-fourth to give the estimated value of the physical as-

sets produced. Expenditures for construction from emergency funds by regular federal agencies (e.g., Corps of Engineers and Bureau of Reclamation) during the depression were included in the various types of structure without discount for the relief aspect, since the funds were expended generally under regular contracts on the same types of project as regular funds.

A similar problem arose in connection with emergency war housing and community facilities which have a relatively short life or low resale value. For these assets, values reported by the owning agencies or realizations on disposals were used.

Other reproducible assets (excluding gold and silver). Machinery and equipment, rolling stock, inventories, and livestock, including the relevant portions of the surplus property previously discussed, accounted for \$11 billion in government assets in 1946, \$3 billion in 1939. Most of the increase was in federal assets.

Some federal agencies maintain reports on the valuation of machinery, equipment, rolling stock, and inventory. The major construction agencies had sizable investments in machinery and equipment. Ships held by the Maritime Commission accounted in 1946 for the predominant share of the federal investment in 'rolling stock', and agricultural commodities held by the Commodity Credit Corporation constituted a large part of the inventory investment. When reported figures such as these were available they were included in the tabulations. Otherwise, the data were based on scattered samples and informed opinions.

A large segment of these assets of government was represented by relatively standardized office machinery, equipment, and supplies. Spot checks suggested an average valuation of \$500 for each employee for machinery and equipment and \$50 for supplies in the federal government in both 1939 and 1946. The effect of the war on space per employee, inventory controls, and the age and quality of the facilities available were assumed to offset the increase in prices from 1939 to 1946. The average value per employee was multiplied by the number of employees in civilian functions.

Monetary gold and silver. Federal monetary policies determine the market value of monetary gold stocks. Since 1934 the federal government has taken all gold offered at \$35 per fine ounce. Valued at this price the monetary gold stock on December 31, 1946 amounted to \$20,529 million; in addition, there was \$177 million of gold in the active portion of the Exchange Stabilization Fund. In 1939, \$16,110 million were in monetary gold stocks and \$156 million in Stabilization Fund gold.

From 1934 until the war, the federal government purchased the entire domestic output of silver and much of the foreign output, as well as other supplies, domestic and foreign. Since July 2, 1946 the government price of newly mined domestic silver has been 90.5 cents a fine ounce (although for monetary purposes it is valued at \$1.29 an ounce). The average cost of the existing monetary silver stocks, however, was much lower, since almost all the domestic silver and all the foreign silver were acquired at considerably lower prices. Deducting cumulative seigniorage and potential seigniorage, \$1,723 million, from the monetary value, \$3,514 million, the net acquisition cost of the silver in the monetary stocks on December 31, 1946 was \$1,791 million. On the basis of the New York market price, 83¾ cents, the current market value was \$2,281 million; on December 31, 1939, when the market price was only 35.1 cents, the value was \$1,031 million. These market values were used in the over-all tables.

4 *Nonreproducible Assets*

Public land resources. Excluding land owned by military agencies, government-owned land was valued at \$12 billion in 1946. Federal lands accounted for nearly \$5 billion, and state and locally owned properties for \$7 billion. The total government land valuation was slightly more than \$7 billion in 1939 including federal land of about \$2.5 billion and state and local land of about \$4.5 billion.

Public lands (excluding reproducible improvements) include some types having high values per unit of area. Sites for public buildings and other structures, parks, playgrounds, and

rights of way for streets in urban areas usually have high values. Forests are valuable; but the return obtainable from the timber stand is difficult to segregate from the bare land which usually has only a low unit value. Finally, a minor share of public lands in experimental farms, highways, and other uses consists of valuable land.

Otherwise public lands are predominantly of low unit value, although they cover an enormous expanse. In 1945 federally owned rural lands comprised 24 percent of the total land area; nearly nine-tenths of these holdings were public domain lands. Federal lands were 85 percent of the total land area in Nevada, 73 percent in Arizona and Utah, 65 percent in Idaho, and 53 percent in Oregon. About 97 percent of the public domain and about 21 percent of the acquired lands were in the 11 Mountain and Pacific Coast states. Almost one-half the acquired lands were owned by the Forest Service.

Federal lands acquired for post offices, national parks, and river, harbor, and flood-control projects were valued in 1946 at their original cost plus an allowance of 70 to 100 percent for appreciation resulting from social and economic development and from the higher price level. Those of the Tennessee Valley Authority were valued at cost plus 55 percent; the smaller increase was used because sizable acquisitions have been made in recent years, in part at wartime prices.

The value of sites for public improvements, exclusive of properties already enumerated, was estimated in 1946 at an average of 15 percent of the total cost of the public works, with an upward adjustment of 100 percent to reflect a rise in land prices. The proportion of the project cost assignable to land is likely to run higher than this average in populous areas and lower in sparsely settled areas. By excluding the major special cases listed above, the scope of this estimate was narrowed considerably. In the District of Columbia the cost of all federal land has run about 17 percent of the total cost of federal land and improvements. In other areas the percentage has apparently been somewhat lower.

Acquired federal rural lands, excluding national parks,

Corps of Engineers' project sites, and Tennessee Valley Authority lands already discussed, and excluding also forest and Indian lands, were valued at \$18 an acre as of the end of 1946; the basis was scattered sales data.

Commercial forest lands are a special case, since their value resides mainly in the timber stand. For these lands, whether acquired or part of the public domain, Forest Service estimates of the average commercial value in 1946 were used as the basis for estimation. The estimates disregarded certain noncommercial values such as those for recreation and rainfall retention. The total value was divided between federal and state and local government holdings on the basis of a weighted average of acreage and saw-timber stand.

Federal public lands not accounted for above were in the public domain. About half of these lands (excluding commercial forest lands) were vacant, unappropriated, or unreserved; the rest were withdrawn public lands. Most of the unreserved lands were worth less than the standard offering price, \$1.25 per acre; otherwise they would be purchased. On the other hand, the reserved lands may run either higher or lower, but part of them are worth many times this price. On the assumption that high and low values were approximately offsetting in 1946, \$1.25 an acre was used as an average value. For 1939, however, an average value of \$1.00 an acre was used. There was a negligible amount of duplication of public lands valued by this method, since sites for some public buildings and structures consisted of rural lands that were included in the acreage data.

Mineral reserves on government lands. The various methods of valuing mineral resources differ in their applicability to measuring government wealth. In many instances the data and the objectives are clearly inapplicable to this study, particularly because the classification of wealth used in this study requires that the value of construction machinery, equipment, and inventories in the mining industry be excluded, and the estimate itself must properly take into account quality and feasibility factors. Commonly used estimates of coal reserves,

for example, assume a standard or degree of exploitation that is far too broad for the coal likely to be produced in the foreseeable future. On the other hand, the estimates of petroleum and iron ore tend to be too conservative in that they do not include all the reserves likely to be utilized even in the near future. In general, the tendency is to underestimate mineral reserves, except when the definition is too broad, as in the case of coal. A principal reason for this underestimation is that in many instances state and local taxes on estimated reserves encourage operators to report only a minimum; another reason is the tendency to report only reserves that have been measured and tested preparatory to the undertaking of actual mining operations.

In general, mineral reserves can be valued either by a physical appraisal as of a given time or by capitalization of the expected future returns. The physical appraisal method requires the assignment of values to the quantities recorded. Such estimates represent a gross value unless they include a discount of the returns expected from future production to allow for interest and risk. On the other hand, such estimates are usually inadequate in that they apply only to the portion of the reserves considered to be definitely proved. From the standpoint of wealth measurement, when the trend of discoveries is favorable, it is necessary to allow for the unreported portion.

The capitalization method starts with the net return assignable to minerals production and works back to an estimate based on a discounting of the returns and the outlook for reserves. Such an estimate excludes outlays for labor, machinery, equipment, and other production expenditures. The net return, however, is not limited to royalties, but includes also profits from the sale of leases or other net returns properly applicable to the reserves.

An advantage of the capitalization method of measuring mineral wealth is that it reduces the common overemphasis on mere physical availability as a factor in valuation. The concept of definite physical limits is rarely accurate when applied to mineral reserves which occur in varying concentrations and

forms. Whether a particular deposit is valuable depends also upon the availability of a suitable process for handling the type of mineral in the formation. Mineral reserves are far different from industrial plants, which constitute visible and definable segments.

Since most government lands are open to exploration, development, and production, the revenue-producing potentialities of the minerals were relied upon primarily in measuring wealth. No attempt was made to measure the value of minerals suitable for the production of atomic energy or other minerals that are in a restricted status. However, a rough approximation was made of the off-shore oil pools claimed as federal wealth. It was assumed that the oil in the off-shore area would about duplicate that in the on-shore area; an allowance was made for the greater hazard and time required for exploration and development in water.

The 1946 estimate of mineral wealth, excluding off-shore oil, assumed that mineral production would increase 3 percent in the calendar year 1947 (the present estimated long term rate), declining gradually to 1.5 percent per year in 30 years to reflect limitations of reserves; thereafter it would continue at a constant level until the returns were so long deferred as to have an insignificant present value. Returns assignable to these on-land reserves were estimated to be 15 percent of the value of the minerals at the mine in 1946. This proportion, 76 percent more than the royalty paid to the federal government on leasable minerals in 1946, represents estimated bonuses and other profits to reserves.

Off-shore oil reserves were assumed to be sufficient for production to increase steadily from substantially no output at all in 1946 to an annual output of 200 million barrels in 1959 and to continue at that level as long as it would have any appreciable effect on the calculations of present discounted value. The net value of the output was determined by applying to the production estimates a net amount of 35 cents a barrel as royalty, bonuses, and other profits to the federal government.

This assumed a royalty of 12.5 percent on the oil to be sold at \$2.50 per barrel; the remainder of the estimate represents profits on the leases.

In calculating the present value of all mineral reserves, 3 percent was accepted as the most feasible discount rate, since the objective was an estimate of national wealth rather than the value a private enterpriser would place on the reserves. Such a rate is undoubtedly lower than a nonintegrated company would use because of the risks it would have to face. Integrated concerns commonly apply a 3 percent discount rate on the ground that control of reserves affords possibilities of profit from non-mining operations. The situation is believed to be similar in government reserves, since the government can reduce the risk element and thereby derive a relatively large benefit from the reserves.

Data on the value of mineral reserves on state land are too fragmentary for estimation on the same basis as for federal lands. These reserves are believed to aggregate roughly one-third of the value of the federally owned reserves exclusive of off-shore oil, and were counted at that portion on the basis of the discounted value.

The estimated value of mineral reserves in 1946 amounted to \$3,950 million. Federal wealth represented in mineral reserves was estimated to be \$3,400 million in 1946, about half in submerged oil reserves; state and local wealth, \$550 million.

ESTIMATED VALUE OF MINERAL RESERVES, 1946
(millions of dollars)

Discount period and area	Total net return for period indicated	Value at end of 1946 at 3% discount rate
Federal lands		
30 years	3,080	1,821
40 years	4,438	2,290
50 years	5,796	2,630
60 years	7,164	2,881
70 years	8,512	3,075
75 years	9,191	3,146
N years (estimate)		3,400
State and local lands (N years assumed)		550
All public lands (N years)		3,950

The 1939 value, \$3,200 million for federal mineral reserves and \$500 million for state and local, was estimated by the same method. The return from off-shore oil was figured at zero for 1940 through 1946. For the other minerals the trend of net returns was extended to cover the intervening years 1940-46.

Collectors' items. The value placed on collectors' items held by federal, state, and local governments was largely arbitrary. It gives recognition, however, to the various collections of documents, rare books, scientific exhibits, curios, and works of art in the possession of governmental agencies. Although some of these items are replaceable, they were assumed to be in this classification if retained for display purposes. It was difficult to evaluate many of these items. Cost was an important indicator for some recent acquisitions and for items that would lose significance if not in the possession of the government.

Evaluation of important records emerging from government administration was impossible. The records in the National Archives as well as in the state, for example, in addition to their intangible historical value, are valuable for the protection of individual or government rights in real property and other legal claims, for genealogy and various other reference purposes. Though a definite value could not be assigned to such records, some of the documents would bring substantial returns if sold to private collectors. The same can be said of selected documents in the possession of the Library of Congress and in various other public collections.

E MILITARY PHYSICAL ASSETS

Military physical assets amounted to an estimated \$80 billion in terms of depreciated replacement value on December 31, 1946. Reproducible assets accounted for \$78 billion, including industrial and nonindustrial facilities, \$13 billion; 'rolling stock' (largely ships and aircraft), \$35 billion; machinery and equipment in industrial facilities, \$3 billion; and other equipment and supplies, over \$26 billion. Nonreproducible assets, exclusively land, were estimated at \$2 billion (Table 6). As

mentioned above, the value of atomic energy construction and equipment has not been allowed for. We arbitrarily set the 1939 depreciated replacement value at \$5 billion, all except \$200 million in reproducible assets.

Table 6
Military Physical Assets of the Federal Government, excluding
Offshore Installations, December 31, 1946
(millions of dollars)

	Original cost	Depre- ciated original cost	Price index *	Depreciated replace- ment value	Market value
Reproducible	82,085	56,200	139	77,903	10,352
Installations (construction only)	17,081	8,835	148	13,115	2,867
Industrial	6,356	3,510	144	5,040	1,242
Nonindustrial	10,725	5,325	152	8,075	1,625
Machinery & equipment	4,141	2,350	143	3,350	935
Rolling stock (largely combatant)	36,863	27,115	129	35,038	3,550
Aircraft & trucks	7,950	4,020	124	4,980	780
Ships, naval & merchant	28,913	23,095	130	30,058	2,770
Other equipment & supplies	24,000	17,900	147	26,400	3,000
Nonreproducible	1,830	1,830	116	2,130	1,065
Land	1,830	1,830	116	2,130	1,065
Total physical assets	83,915	58,030	138	80,033	11,417

* Original procurement prices equal 100.

The 1946 depreciated replacement value, \$80 billion, allows for an average price increase of about 38 percent between the time the assets were initially procured and December 31, 1946. The original cost was \$84 billion and the depreciated historical cost \$58 billion. The foregoing figures are all in terms of military uses. If this same property were placed on the civilian market the estimated realization would be only about \$11 billion.

1 *Basis of Valuation*

The agency figures were in terms of original cost. Most of the military assets on hand as of December 31, 1946 had been procured by the vast World War II defense expenditures in 1941-46. In terms of the military purposes for which they were acquired, therefore, they were on the average relatively new. Even so, the depreciation and particularly the obsolescence factors for certain classes of these assets are high, if experi-

ence during World War II is a criterion. For example, aircraft have a service life of 3 to 5 years; war-built manufacturing facilities and installations have rapidly depreciated in many cases.

Depreciated historical cost and depreciated replacement value were estimated on the assumption that the assets would continue to be held or used for the initial military purposes. To obtain figures on depreciated replacement value, depreciation factors were applied to original cost, then allowance was made for increases in price from the time the present assets were procured to December 31, 1946. For example, for industrial facilities the historical cost figures were reduced about 45 percent, then a price rise of about 44 percent was allowed on depreciated historical cost to approximate the depreciated replacement value.

Valued on this basis the military property constitutes a sizable portion of the nation's total wealth. These large figures reflect the fact that, under present unsettled world conditions, the tools of war have a high national value. The large scale experience we have had in the sale of military property through the War Assets Administration and the Foreign Liquidation Commissioner indicates that in the competitive civilian market the remaining military assets would have a very low value. Rough estimates of \$11 billion contrast sharply with a depreciated replacement value for military purposes of \$80 billion.

2 *Limitations of Data*

Because of the scope and character of the data the estimates are exceedingly rough. The totals include the assets of the National Military Establishment (Air Force, Army, and Navy), the warbuilt plant and strategic supplies of the Reconstruction Finance Corporation, and the portion of the maritime fleet and facilities deemed to be primarily of military use.

The reports of the War (Air Force and Army) and Navy Departments on the value of facilities they own in the continental United States are in terms of original cost and are difficult to convert to a different valuation basis. Furthermore,

no integrated inventory of either industrial or command (non-industrial) facilities on a government-wide basis exists. It was practically impossible to integrate the figures for the several agencies, partly because the figures of the military agencies probably overlapped the War Assets Administration figures. The same was true of the industrial machinery and equipment figures.

The Navy Department publishes balance sheet data showing its assets. The records, however, are in terms of original cost for the property still on hand and do not reflect its condition. Moreover, coverage is incomplete.

Reports of the War Department were even less adequate. Figures for supplies on hand in the Technical Services did not cover equipment or supplies issued to the troops. This resulted in substantial understatement. For the Air Force, no value data were readily available. The figures for this study, therefore, include only a rough valuation of complete aircraft on hand, plus an even rougher estimate of spare parts. The use of Army and Air Force reports was limited by the fact that many are confidential and details could not be published.

Over-all data on RFC industrial facilities include figures on depreciation allowances. Estimates based on cumulative expenditures by the Maritime Commission and the War Shipping Administration were useful in calculating the original cost of the war-built merchant fleet. Since they did not reflect disposals and depreciation, however, unpublished information was used to make rough adjustments.

3 *Reproducible Assets*

The fixed facilities (construction only) covered in this study—installations of the National Military Establishment, the Reconstruction Finance Corporation, and the Maritime Commission—aggregated \$17 billion in original cost, including over \$6 billion of industrial plant and \$11 billion of command facilities. To compute the depreciated historical cost, the industrial facilities were depreciated about 45 percent, the nonindustrial about 50 percent. The depreciated replacement value,

\$13 billion, as of December 1946 allowed for an average price rise of about 48 percent after acquisition. The market value was estimated to be 15-20 percent of original cost. The original cost of the machinery and equipment in the foregoing industrial facilities, using crude assumptions based on War Production Board data, was estimated to be \$4 billion. In computing depreciated replacement value, \$3 billion, the factors used were by and large comparable with those in the facilities calculations.

'Rolling stock' of the National Military Establishment and Maritime Commission cost originally about \$37 billion; including complete aircraft, largely combat, nearly \$8 billion; naval fleet, \$22 billion; Maritime Commission vessels in reserve and in active use, \$7 billion; and watercraft and trucks of the War Department. The depreciation factors for aircraft assume an average service life of about 4 years, for naval vessels built during World War II a life of about 15 years, and for maritime vessels a life of 10-15 years depending on whether they are in reserve or in active use. In arriving at the depreciated replacement value, \$35 billion, price increases of about 29 percent were assumed. Most of the market value in this category would be in the cargo vessels of the Maritime Commission and the Navy and the transport aircraft of the National Military Establishment. The naval combatant fleet and the combatant aircraft would have only scrap value.

Other equipment and supplies make up the inventory of the National Military Establishment and the strategic stockpile. The aggregate original cost was estimated to be \$24 billion, including \$14 billion of Navy Department holdings. As indicated above, the figures for the Air Force and Army were probably greatly understated. The figures for the National Military Establishment included vast amounts of ordnance and ammunition, communications equipment, aircraft parts, and similar military equipment and supplies. To compute the depreciated historical cost, different assumptions were made concerning the life of the several classes of material, running from 5 to 15 years, so that the average life assumed was above

8 years. In computing the depreciated replacement value, \$26 billion, price increases of about 47 percent were assumed. The market value of this material was relatively small, of course, since much of it was ordnance, ammunition, and similar material which would have to be scrapped.

The \$82 billion of military reproducible assets in original cost terms remaining on December 31, 1946 represented less than 40 percent of the \$215 billion expended by the federal government for munitions and war construction in the fiscal years 1941-46, plus the relatively small amounts of military assets previously on hand.⁷ During the six defense preparation and war years \$30 billion was expended for construction and equipment. Installations and machinery of about \$21 billion were still classified as military assets as of December 31, 1946; other installations costing billions of dollars had been transferred to the War Assets Administration and were classified as 'civilian' assets. For naval and merchant ships over \$40 billion had been spent; about \$29 billion were accounted for under military assets and some were counted as 'civilian' assets. Expenditures for aircraft and aircraft parts were about \$45 billion; nearly \$8 billion of complete aircraft remained, plus an estimated \$3-4 billion in spare engines and parts (classified as 'other equipment and supplies'). Expenditures for all other 'equipment and supplies'—guns and fire control, ammunition, tanks, and other combat vehicles, communications equipment, and other equipment and supplies—were about \$100 billion. About \$20 billion remained on hand at the end of 1946, of which nearly one-half was ordnance equipment, supplies, and vehicles. And, as indicated above, items in the hands of troops, particularly for the Army, were not included in the inventory.

4 *Nonreproducible Assets*

The land held for military purposes is estimated to have cost the government \$1,830 million. Lack of integrated information on holdings made it difficult to ascertain accurately either the acreage or the cost. The convention of valuing public do-

⁷ Roughly the same as the \$4.8 billion on hand on December 31, 1939.

main at the 1860 figure, \$1.25 per acre, perhaps did not give enough weight to these lands, of which the War Department alone held over 20 million acres at the end of 1946. In terms of original cost the Navy was estimated to have about two-thirds of all the military land. Although its acreage was far smaller than that of the War Department, land used for shipyards and similar Navy installations in urban areas had a relatively higher original cost.

APPENDIX: SOURCES AND METHODS

Notes on Tables 3 and 4

GOVERNMENT CORPORATIONS AND CREDIT AGENCIES

Data were derived from a compilation of balance sheets (*Treasury Daily Statement*, Jan. 31, 1940, p. 6; Feb. 17, 1947, pp. 12-5). The following adjustments were made:

All Treasury assets and liabilities were excluded.

Real estate and other physical assets were excluded. It was assumed from a comparison with other sources that \$222 million of CCC assets in 1939 was wrongly classified as 'loans', instead of assets (commodities) acquired and held for sale (*Agricultural Finance Review*, Nov. 1948, Table 12, p. 114).

Private loans guaranteed by the Export-Import Bank and the Commodity Credit Corporation were excluded from both assets and liabilities.

Loans made to states, territories, and other public bodies are shown as 'obligations of state and local governments'.

Private equity in government corporations excludes the stock of the Federal Deposit Insurance Corporation held by Federal Reserve banks.

Values for 1946 are net of 'reserves for losses'. In 1939 'reserves for uncollectible items' are deducted from loans; 'other operating reserves' are excluded from liabilities and treated as part of federal equity.

'Accrued interest payable' for 1946 represents only an estimate on debt held outside the Treasury.

TREASURY DEPARTMENT

Data were derived from *Treasury Daily Statement* (Dec. 29, 1939; Dec. 31, 1946; Jan. 2, 1947; Feb. 17, 1947) with the following exceptions:

Claims

Other claims receivable. Accrued tax claims, 1939: estimated for personal and corporation income taxes and estate and gift taxes on basis of tax liabilities for 1939 (*Statistics of Income, 1939*, Parts 1 and 2), plus arbitrary allowance of \$268 million for back taxes due, additional assessments, excise taxes, customs, and employment taxes. Results checked against corresponding Commerce data (*Survey of Current Business*, National Income Supplement, July 1947, Table 8). 1946: estimate for individual and estate and gift tax accruals based on Bureau of Internal Revenue collection reports, corporate tax accruals estimates based on Commerce data (*Survey of Current Business*, July 1948, and preliminary data for *Statistics of Income, 1946*, Part 2).

TAX ACCRUALS
(millions of dollars)

	1939	1946
Corporate tax accrual	1,232	9,200
Individual income tax accrual	929	5,300
Estate and gift tax accrual	271	1,000
All other	268	
	2,700	15,500

Accrued interest receivable, 1939: estimated on basis of accrued interest payable by government corporations and credit agencies.

Obligations of federal agencies, guaranteed: 1939: Special obligations (*Treasury Bulletin*, Feb. 1940, p. 31).

Gold certificates and similar claims: includes Federal Reserve notes in General Fund and gold reserve behind U.S. notes and Treasury notes of 1890.

Loans: includes loans to railroads, advances to Federal Reserve banks for industrial loans, World War I loan to Finland and loan to United Kingdom (*Treasury Form 30*, Dec. 31,

1946; *Annual Report, Secretary of the Treasury, 1939*, p. 795; 1946, p. 561).

All other, 1939: includes miscellaneous and unclassified deposits and securities transferred from the Reconstruction Finance Corporation. 1946: includes miscellaneous and unclassified deposits, Lend-Lease credits (*Foreign Transactions of U.S. Government*, Part 2, Dec. 31, 1946, p. 151), accrued assets due from governmental agencies (*Treasury Form 30*, Dec. 31, 1946), and advances and prepayments to contractors (SEC, Statistical Series Release 779).

Stocks, 1939: stock in federal savings and loan associations; 1946: includes also \$323 million in stock of International Bank for Reconstruction and Development and of International Monetary Fund (*Treasury Form 30*, Dec. 31, 1946).

Liabilities and Proprietorships

Claims payable. Accrued tax refunds: includes estimates of personal, estate, corporate, and AAA processing taxes.

ACCRUED TAX REFUNDS (millions of dollars)

	1939	1946
Personal income and estate taxes }		{ 1,700
Corporation income taxes }	35	{ 1,000
AAA processing taxes	45	
Total	80	2,700

Accrued interest payable: estimated on basis of volume and composition of outstanding debt.

Accrued wages and salaries: excludes military pay; assumes that there is no lag between pay day and pay period in 1939; 1-2 weeks in 1946; and an average accrual of 22.7 days of annual leave (on basis of survey by Senate Committee on Appropriations). No allowance was made for sick leave (a contingent obligation only). Pay rates are based on Civil Service Commission surveys. The totals include \$310 million in accrued pay and \$450 million in accrued annual leave in 1946; in 1939 the latter was \$150 million and the former, zero.

Public debt, direct: excludes U.S. notes, national bank notes, Federal Reserve bank notes, and other currency.

Claims payable in gold: includes gold certificates and gold in Exchange Stabilization Fund (*Treasury Bulletin*, March 1940, p. 47; March 1947, p. 72).

Currency in circulation: excludes Federal Reserve notes (*Banking and Monetary Statistics*, Table 110, p. 413; *Treasury Bulletin*, March 1947, p. 75).

All other claims payable: includes general fund liabilities, Treasury currency held by Federal Reserve banks (*Annual Report, Board of Governors of the Federal Reserve System*, 1939, p. 32; 1946, p. 70), trust and deposit liabilities (*Treasury Form 30*, Dec. 31, 1946), and claims owed U.S. corporations (SEC, Statistical Series Release 779).

FEDERAL RESERVE BANKS

Data were derived from statements of condition of Federal Reserve banks (*Annual Report, Board of Governors of the Federal Reserve System*, 1939, pp. 32-5; 1946, pp. 70-1). All figures are net of valuation reserves. The following adjustments were made: bank premises were excluded, since they are physical assets, classified elsewhere; Federal Reserve notes held by Treasury and Federal Reserve banks were excluded from 'currency in circulation' (*Banking and Monetary Statistics*, p. 413; *Treasury Bulletin*, July 1947, p. 82); surplus account (Sec. 13b) was treated as a claim payable to the Treasury Department.

TRUST ACCOUNTS

Data were derived by adding the excess of receipts over expenditures (excluding investments) plus accrued interest during the next six months (*Treasury Daily Statement*, Dec. 29, 1939, p. 3; Feb. 17, 1947, pp. 9-11) to assets in trust accounts as of June 30, 1939 and 1946 (*Annual Report, Secretary of the Treasury*, 1939, pp. 81-98; 1946, pp. 563-84). Methods used on individual items follow.

Claims

Demand and time deposits. In Treasury and federal agencies, 1939: unexpended balances June 30, 1939, plus excess of receipts over expenditures and investments; 1946: unexpended

balances, the residual after deduction of other items from total assets. Unexpended balance of U.S. Government Life Insurance Fund excluded.

Other claims receivable. Accrued interest receivable: estimates based on investment portfolio.

U.S. government securities, 1946: from tabulation supplied by Treasury Department, Fiscal Services, Bureau of Accounts.

Loans, policy loans of U.S. Government Life Insurance Fund: interpolation between amounts shown on balance sheets at beginning and end of fiscal years (*Annual Report, Secretary of the Treasury*, 1939, p. 88; 1940, p. 212; 1947, p. 461).

Liabilities and Proprietorships

Claims payable. All other claims payable: entire assets of trust funds assumed to be payable to beneficiaries.

ALL OTHER (FEDERAL)

Data derived from the following sources for the various agencies and funds involved:

Exchange Stabilization Fund: all data from balance sheets of the Fund (*Treasury Bulletin*, April 1940, p. 52; May 1947, p. 81). Gold held by the Federal Reserve Bank of New York and the U.S. Assay Office excluded and classified elsewhere as a physical asset.

Postal Savings System: based on balance sheet data (*Banking and Monetary Statistics*, p. 519; *Treasury Daily Statement*, April 1, 1947, p. 11, note 7) and total assets and deposit liabilities (*Federal Reserve Bulletin*, July 1947, p. 869).

Office of Alien Property, 1939: included in trust accounts; 1946: based on October 1, 1946 data (*Terminal Report, Office of Alien Property Custodian*, Oct. 1946, Table 4, p. 84). Represents net equity vested, after direct expenses; excludes real estate and patents. Assumes entire equity vested in Alien Property Custodian in accordance with 1945 agreement (*ibid.*, p. 3).

Other agencies (by items):

All other claims receivable, 1946 only. Includes receivables of \$389 million for War Assets Administration (obtained from

WAA) and \$176 million for Office of Foreign Liquidation Commissioner (*Foreign Transactions of the U.S. Government*, Dec. 31, 1946, App. Table 21, p. 151).

Direct investment abroad. 1939: arbitrary estimate; 1946: includes estimate by Sammons (see his App. Table 3) for direct foreign assets (realty and movables) of federal government, plus an arbitrary estimate, \$2.4 billion, for the depreciated historical cost of government installations in Alaska, Hawaii, Puerto Rico, and the Canal Zone.

All other claims payable. Includes \$200 million in 1939 and \$360 million in 1946 for Indian lands (*Annual Report, Secretary of the Interior, 1946*, p. 363) and \$80 million in 1939 and \$132 million in 1946 for improvements (estimated from Budget expenditures).

STATE AND LOCAL GOVERNMENTS

Claims

Currency. Rough guess, based on a few scattered ratios of vault holdings to bank deposits.

Demand and time deposits in banks. For 1946 from FDIC, *Report 26, Assets and Liabilities, December 31, 1946, Operated Insured Commercial and Mutual Savings Banks*, pp. 9, 33; plus \$179 million in uninsured banks, as derived from FDIC, *Annual Report, 1946*, Table 110. For 1939, FDIC, *Report 12, December 30, 1939*, pp. 5 and 29, plus \$92 million in uninsured banks estimated at the same ratio as deposits in such banks in 1946. All governmental deposits in uninsured banks are assumed to be state and local.

Other claims receivable. Accrued tax claims: mainly rough guesses, guided somewhat by ratios in F. L. Bird, *Trend of Tax Delinquency, 1930-1946* (Dun & Bradstreet, 1947), and by scattered reports of a few cities, e.g., monthly statements of the New York City Department of Finance.

Accrued interest receivable: token estimates.

U.S. government securities: *Treasury Bulletin*, May 1947, p. 48.

Obligations of state and local governments: *Annual Report*,

Secretary of the Treasury, 1948, pp. 629-30, with interpolations for December 31. It is assumed that state and local units did not hold any obligations of territories and possessions, and that the latter held no more than a negligible quantity of state and local obligations.

Loans and all other: guesses to represent mortgage loans, nongovernmental bonds, service charges receivable, and all other claims except prepaid expenses, which are netted out of claims payable.

Stocks. Guesses to represent equities in private enterprises, including such investments held by public endowment and trust funds.

Direct investments abroad. Probably negligible.

Liabilities and Proprietorships

Accrued tax refunds. Token estimates.

Accrued interest payable. Estimate based for 1939 on about \$16.3 billion of debt, and for 1946, about \$13.6 billion, held by others than state and local governments, at assumed average rate of about 3 percent and year-end average accrual of about two months.

Accrued wages and salaries. Assumed end-of-year (lower than at other dates) of about 2 percent on estimated payrolls of \$4.2 billion in 1939, \$6.3 billion in 1946 (compensation paid to employees: from national income estimates, Department of Commerce).

Public debt, direct. Interpolation between June 30 totals of interest bearing debt shown in *Annual Report, Secretary of the Treasury, 1948*, p. 628, with deductions to exclude debt of territories and possessions. For each year \$0.2 billion was added to cover non-interest bearing debt (and possibly other omissions) on the basis of differences between the Treasury totals and total gross debt as shown by the Bureau of the Census, Governments Division, in its *Summary of Governmental Debt in 1948* (Dec. 1948).

All other claims payable. Assumes an average lag of about 5 percent of annual total on all expenditures other than for

employees' pay and interest on debt. Prepaid expenses are assumed to be offset against claims payable. Trust fund liabilities (excluding unemployment compensation funds to the extent that they are covered by deposits in the federal Treasury) are assumed to equal the net assets of the funds; the trust fund asset valuations are estimated to be \$5.6 billion in 1946 and \$3.0 billion in 1939, on the basis of reported totals:

1946, state retirement funds, \$1.7 billion; 37 large-city retirement funds, \$1.1 billion (Census Bureau, Governments Division, *State Finances, 1946, Compendium*, p. 39, and 1947, p. 44; *Large City Finances in 1946*, p. 51, and 1947, p. 49).

1939, retirement and other trust funds of states, \$2 billion; of cities with more than 100,000 population, \$0.9 billion (*Financial Statistics of States, 1939*, Vol. 3, pp. 141-6, and 1940, Vol. 3, p. 45; *Financial Statistics of Cities, 1939*, Vol. 3, pp. 199-206, and 1940, Vol. 3, p. 96).

On the basis of ratios derived from *ibid.*, *Retirement Systems for State and Local Government Employees: 1941* (Special Study 17, Oct. 1943), the reported amounts are assumed to represent 95 percent of all state and local retirement funds in 1946, and 95 percent of all state and local trust funds in 1939. All other trust funds in 1946 are estimated on the basis of the ratios of state and large-city retirement funds to other trust funds, as reported in 1940.

Notes on Table 5

FEDERAL GOVERNMENT

Reproducible Assets

For purposes of this source note, the derivation of the values for construction assets, including residential buildings, other structures, and roads and streets, is shown in Appendix Table 1.

Construction assets. Classified according to character or purpose. In the case of the structures for resource development, the multiple-purpose projects are classified by the predominant purpose.

Values of the construction assets in Table 5, from the last column of Appendix Table 1, were derived by tabulating the total historical costs of these improvements back to 1791; subtracting the value of land; adjusting the cost of improvements for depreciation, obsolescence, and supersession; and adjusting the depreciated cost of the improvements for changes in price.

To facilitate the computations the historical costs were added by 5-year intervals and depreciation schedules were set up to yield depreciated values of the improvements as of December 31, 1939 and 1946. For example, in the case of 'light-houses and other coastal facilities', the depreciation rate was 1.5 percent for the first 40 years, 0.8 percent for the next 50 years. The depreciated value of 1930-34 construction at the end of 1946 would be 77.5 percent of the historical cost. (The midpoint of the interval 1930-34 is 15 years removed from December 31, 1946 and the depreciation at 1.5 percent would amount to 22.5 percent of the historical cost.) Similarly, the depreciated value of 1870-74 construction at the end of 1946 would be 12 percent of the historical cost. (The midpoint of the interval 1870-74 is 75 years removed from December 31, 1946, and depreciation at 1.5 percent for 40 years and 0.8 percent for the next 35 years would amount to 88.0 percent of the historical cost.) According to this depreciation method, the depreciated value of construction 90 years old or older at the end of 1946 would be zero, although cost values are included in the historical series from 1791 to 1946.

Machinery and equipment, rolling stock and inventory. See the text.

Livestock. Estimates including livestock on experimental farms and federal institutions. The value of livestock owned by Indians on reservations is excluded (about \$40 million in 1946).

Monetary gold and silver. Data on gold are derived from monetary gold stocks (plus active gold in the Stabilization Fund) valued at \$35 per fine ounce. Data on silver are derived from silver monetary stock valued at New York market price of 35.1

Appendix Table 1: Derivation of Estimates of Value of Reproducible Construction Assets of Federal Government, excluding Military Assets, 1946 and 1939 (millions of dollars)

	ESTIMATED HISTORICAL COST			IMPROVEMENTS		
	Total ^a	Land ^b	Improve- ments	Depreci- ation schedule ^c	Depreci- ated hist. cost	ADJUSTMENT FOR PRICE CHANGES
						Factor ^a	Adj. cost
D E C E M B E R 3 1 , 1 9 4 6						
Construction assets	15,850	1,011	14,839		7,486	12,265
Urban housing (predominantly emergency)	2,118	307	1,811	A	480	719
Other structures	13,160	704	12,456		6,621	10,892
Public buildings	1,758	276	1,482	B	1,041	1,978
Resource development						
Predominantly reclamation, power & valley author- ity improvements	1,929	66	1,863	C	1,652	2,560
Predominantly flood control, river-channel & harbor improvements	3,702	102	3,600	C	2,757	4,825
Other resource development	441		441	C	273	465
Lighthouses & other coastal facilities	199	14	185	D	95	167
Airports & air navigation facilities	107	•	107	E	91	131
Real property held for disposal	4,928	246	4,682	F	634	634
Structures held in trust, improvements on Indian lands	96		96	G	78	132
Roads & streets	572		572	H	385	654
D E C E M B E R 3 1 , 1 9 3 9						
Construction assets	6,897	513	6,383		5,076	6,442
Urban housing (predominantly emergency)	697	104	593	A	500	500
Other structures	5,752	409	5,342		4,210	5,612
Public buildings	1,417	212	1,205	B	904	1,311
Resource development						
Predominantly reclamation, power & valley author- ity improvements	859	26	833	C	753	852
Predominantly flood control, river-channel & harbor improvements	2,714	74	2,640	C	2,066	2,893
Other resource development	364		364	C	275	302

Lighthouses & other coastal facilities	143
Airports & air navigation facilities	27
Real property held for disposal	148
Structures held in trust, improvements on Indian lands	80
Roads & streets	448

* Except as noted below, historical costs of improvements and land 1791-1936 are from a summary of federal expenditures on public works compiled by the Public Works Administration, Projects Division, from official Treasury statements; costs from 1937 to December 1946 were compiled from *Budget of the United States Government* for fiscal years 1937-49. Exceptions are: (a) costs for roads and streets 1894-1941, taken from *Public Aids to Domestic Transportation* (House Document 159, 79th Cong., 1st Sess., p. 542); for 1942-47 from federal budgets; (b) costs of housing, from reports of Housing and Home Finance Agency; costs for property held for disposal in 1946, from reports of War Assets Administration. Above sources were supplemented by various agency reports and the *Treasury Daily Statement* for January 31, 1940 and December 29, 1946.

^b Historical land costs, when not from primary sources such as annual reports of the Chief of Engineers of the War Department, Tennessee Valley Authority, Secretary of the Interior Department, supplemented by *Federal Ownership of Real Estate and its Bearing on State and Local Taxation* (House Document 111, 76th Cong., 1st Sess.) and *Federal Rural Lands* (Bureau of Agricultural Economics, June 1947), were generally estimated at 15 percent for housing and public buildings and 7 percent for lighthouses and other coastal facilities.

* Depreciation, obsolescence, and supersession were estimated roughly by applying the following rates to the estimated historical cost of improvements:

A *Housing*: for war housing and veterans re-use housing 75 percent; for other types smaller percentages.

B *Public buildings*: 1.4 percent for each of first 50 years and 0.75 percent for each of next 40 years.

C *Resource development*: reclamation, flood control, river-channel & harbor improvements, including hydro-electric power generation

10	133	D	56	1.60	90
•	27	E	24	1.08	26
88	60	F	60	1.00	60
		G	72	1.10	79
	80	H	366	0.90	329
	448				

facilities at 1.25 percent for each of first 60 years and 0.5 percent for each of next 50 years; power transmission and distribution facilities at 2.5 percent for each of first 30 years and 1.25 percent for each of next 20 years, other resource developments at 3 percent for each of first 25 years and 1.25 percent for each of next 20 years.

D *Lighthouses and other coastal facilities* 1.5 percent for each of first 40 years and 0.8 percent for each of next 50 years

E *Airports and air navigation facilities*: Airports at 2.4 percent for each of first 25 years and 1.6 percent per year for 40 years navigation facilities at 2.5 percent per year for 40 years

F *Real property held for disposal*: Surplus real property in Dec. 1946 at 86.5 percent on basis of ratio of actual sales realizations to actual cost of property sold to date, property for resale in 1939 (largely held by Federal Land banks) valued as shown in *Treasury Daily Statement* for January 31, 1940.

G *Improvements on Indian lands* 1.5 percent for each of first 50 years and 1.0 percent for each of next 25 years.

H *Roads and streets*: 3 percent for each of first 22 years and 0.67 percent for each of next 51 years.

^a The factors shown are rough estimates of the ratio of unit construction costs on December 31, 1949 and 1939 to the weighted average cost at the time of the original investment. In determining these ratios, the following cost indexes were used as guides: American Appraisal Company Index, Associated General Contractor's Index, *Engineering News Record* Index of Construction Costs and Index of Building Costs, Public Roads Administration Highway Index. For a description of these indexes, see *Construction and Construction Materials*, Industry Report, Statistical Supplement, May 1948, Bureau of Foreign and Domestic Commerce, pp. 41-3.

* Less than \$500,000.

cents and 83.75 cents per ounce at the end of 1939 and 1946, respectively (*Treasury Bulletin*, April 1940, p. 52; May 1947, pp. 81-4).

	1939 (millions of dollars)	1946 (millions of dollars)
Monetary gold stocks	16,110	20,529
Exchange Stabilization Fund	156	177
Monetary silver	1,081	2,281
Total	17,297	22,987

Nonreproducible Assets

Land. Much of the discussion on source and methods of estimating land values is included in the text. In Appendix Table 2, the 'Adjusted value' column provides an estimated value for the various classifications of federal land values presented in Table 5.

Appendix Table 2
Derivation of Estimates of Land Value, Federal Government,
excluding Military Lands, 1946 and 1939
(millions of dollars)

	December 31, 1946			December 31, 1939		
	Est. hist cost ^a	Price adj. factor ^b	Adj. value	Est. hist. cost ^a	Price adj. factor ^b	Adj. value
Land			4,926			2,596
Residential sites, acquired	307	1.0	307	104	1.0	104
Sites for other structures, primarily acquired	815		1,334	535		662
Reclamation, flood control, river-channel & harbor projects including TVA	168	1.7	286	100	1.2	120
Real property held for dis- posal	246	1.0	246	88	1.0	88
Post Office sites	139	2.0	278	125	1.5	188
Sites for all other structures ^c	262	2.0	524	222	1.2	266
Forests, parks & unimproved lands			3,285			1,830
Forests (except on Indian lands), incl. com. timber			2,006			1,077
Parks, acquired lands only	90 ^d	1.9	171	74 ^d	1.0	74
Acquired lands, n.e.c.			401			191
Other public domain			347			238
Indian lands, held in trust			360			200

^a See 'Land' column in Appendix Table 1.

^b Adjusted in accordance with Index of Farm Real Estate Values and other information; no adjustment for residential sites, which are valued as of dates shown.

^c Includes some sites on public domain or donated lands.

^d Historical costs not summarized; valued as of dates shown.

Subsoil assets. See the text.

On-shore mineral production was based on projections of Geological Survey data on the value of federally leased mineral production and the royalty obtained, 1935-46. The value of the product was increased 20 percent to approximate total production from federal lands, including the product from non-leased lands. The net value assignable to reserves was taken to be 15 percent of this total to account for both royalties and profits accruing to the lessors. Off-shore oil deposits are expected to increase rapidly in yield from 1947 to approximately 200 million barrels annually by 1959, continuing at that rate thereafter. The 200 million barrel annual production is a conservative estimate.

Collectors' items. The valuation is largely arbitrary, as explained in the text.

STATE AND LOCAL GOVERNMENTS

Reproducible Assets

Estimates of reproducible assets and sites acquired by purchase are based primarily on the historical record of construction expenditures, as tabulated by the Bureau of Foreign and Domestic Commerce, Construction Division, in *Construction and Construction Materials: Industry Report—Statistical Supplement, Construction Volume and Costs, 1915-1947* (May 1948). Arbitrary additions were made to reflect such expenditures prior to 1915 for assets still of some value in 1939 or 1946 and also for purchases of existing assets from private owners. *Construction assets.* The derivation of the value estimates is summarized for major classes of construction assets in Appendix Table 3. The depreciation and amortization factors, service-life assumptions, and price adjustments are discussed in the text. Their source and computation are explained briefly below.

In addition to figures published in the *Industry Report* cited above, and adjustment factors listed in the notes to Appendix Table 3, the estimates are based on the following assumptions:

Appendix Table 3
Derivation of Estimates of Value of Reproducible Construction Assets of State and Local Governments,
1946 and 1939
(millions of dollars)

	ESTIMATED HISTORICAL COST			Depreci- ation schedule ^b	IMPROVEMENTS	
	Total	Land ^a	Improve- ments		Depreci- ated hist. cost	ADJUSTMENT FOR
						PRICE CHANGES
					Factor ^c	Adj. cost
D E C E M B E R 3 1 , 1 9 4 6						
Construction assets	57,900	2,800	55,100	32,710		55,350*
Residential buildings	800	100	700	660	1.6	1,050
Other structures	27,000	2,700	24,300	16,050		28,600*
Nonresidential buildings	14,100	2,100	12,000	8,600	1.8	15,400
Sewage disposal & water supply facilities	7,200	100	7,100	4,200	1.9	7,900
Emergency public works except roads & streets ^a	2,600		2,600	1,950	1.6	3,100
'All other' construction	3,100	500	2,600	1,300	1.7	2,200*
Roads & streets	30,100		30,100	16,000		25,700
Regular, including federally-aided	28,500		28,500	14,800	1.6	23,600
Emergency public works ^a	1,600		1,600	1,200	1.7	2,100
D E C E M B E R 3 1 , 1 9 3 9						
Construction assets	49,265	2,410	46,855	31,555		33,705*
Residential buildings	65	10	55	55	1.0	55
Other structures	23,600	2,400	21,200	15,600		19,350*
Nonresidential buildings	12,800	1,900	10,900	8,500	1.3	11,100
Sewage disposal & water supply facilities	6,250	100	6,150	4,000	1.2	4,800

Emergency public works except roads & streets ^a	1,950
'All other' construction	2,600
Roads & streets	25,600
Regular, including federally-aided	24,400
Emergency public works ^a	1,200

^a Land costs were assumed to be as follows:

Residential and nonresidential buildings and 'all other' construction, 15 percent of historical cost

Sewage disposal and water supply, 15 percent.

Roads and streets and emergency public works—land not segregated from improvement costs.

^b Depreciation, obsolescence, and supersession were estimated roughly by applying the following rates to the historical cost of improvements:

A *Residential buildings*: 1.75 percent for each of the first 40 years; 1 percent for each of the next 30 years.

B *Nonresidential buildings*: 1.4 percent for each of the first 50 years; 0.75 percent for each of the next 40 years.

C *Sewage disposal and water supply facilities*: 2 percent for each of the first 40 years; 0.5 percent for each of the next 40 years.

D *'All other' and emergency public works, except roads and streets*: 3 percent for each of the first 25 years; 1 percent for each of the next 25 years.

E *Roads and streets*: 3 percent for each of the first 22 years; .667 percent for each of the next 51 years.

To facilitate computation, these factors were applied to historical

	1,950	D	1,750	1.1	1,950
400	2,200	D	1,350	1.1	1,500*
	25,600		15,900		14,300
	24,400	E	14,800	0.9	13,300
	1,200	E	1,100	0.9	1,000

cost, excluding land, as summated for 5-year intervals (1915-19, 1920-24, etc., except that 1945 and 1946 were computed separately). Pre-1915 investment, estimated roughly, was depreciated in the same manner.

* Rough estimates of the ratio of unit construction costs on December 31, 1946 or 1939 to the weighted average cost at the time of the original investment. In determining these ratios, the following indexes were used as guides: Residential buildings' American Appraisal Company index; Other structures: *Engineering News-Record* construction cost index; Roads and streets: Public Roads Administration index of price trends in highway construction.

^a Adjusted to eliminate relief and maintenance expenditures, and arbitrarily divided between 'roads and streets' and 'other structures'. About 30 percent of emergency public works were not identified here, but were included in other categories, as in the compilation from which total historical cost is derived (cf. *Construction Volume and Costs, 1915-1947*, p. 5, note).

* To this estimate was added, in Table 5, \$100 million to represent the value of acquisitions of finished properties from private owners (mainly public utility properties), minus dispositions to private owners.

Nonresidential buildings: pre-1915 original expenditures for construction and sites assumed to be \$2.7 billion, spread at an accelerating rate from 1850 through 1914; 1915-19, estimated to be \$1,050 million, in the reported federal-state-local total of \$1,127 million; 1920, not reported, interpolated at \$266 million.

Sewage disposal and water supply facilities: pre-1915 total assumed to be \$1.5 billion, spread at accelerating rate from 1860.

'All other' construction: pre-1915 total assumed to be \$400 million, spread at accelerating rate from 1890.

Roads and streets, regular, including federally-aided: pre-1915 total assumed to be \$3.8 billion, spread at accelerating rate from 1860.

Emergency public works: actual expenditures, discounted 27 percent for the relief element involved, are divided on the assumption that half was for roads and streets, half for other construction. To eliminate maintenance activities, the amount allocated to roads and streets is discounted another $33\frac{1}{3}$ percent, and the amount for other construction, another 10 percent. Consequently, the amount shown for roads and streets represents 19.9 percent of total emergency public works expenditures, and the amount for 'all other' construction, 31.5 percent. This treatment applies, however, only to expenditures specifically reported under 'work relief' in *Construction Volume and Costs, 1915-1947*, p. 5. As noted there, about 30 percent of the expenditures is included in other figures for new public construction and cannot be segregated for each type of construction. The 50-50 division is based on *Final Report on the WPA Program, 1935-43* (Government Printing Office, 1947), p. 122. The discounts for relief and for road and street maintenance follow the Board of Investigation and Research, *Public Aids to Transportation* (79th Cong., 1st Sess., House Doc. 159, 1944), p. 531. The maintenance discount for construction other than roads and streets is a guess.

The service-life assumptions, applied to historical costs of physical construction assets, are intended to represent rough,

generalized averages for all improvements of the specified types. Instead of applying a uniform straight-line depreciation and amortization factor over the whole period, these computations assume a more rapid rate of diminution of value in the earlier years of service-life than in the later years. This use of two life-schedules for each type of asset is prompted by considerations similar to those discussed in the report of the research staff of the Board of Investigation and Research on public aids to transportation (pp. 222-5).

Other reproducible assets. All these figures are guesses, guided by a few scattered inventory reports. 'Equipment' includes collections in public libraries and museums.

Nonreproducible Assets

Residential sites and sites for other structures. These are the estimated historical costs, as shown in Appendix Table 3, adjusted for price appreciation by applying very rough adjustment factors, as shown in Appendix Table 4.

Forests, parks, and unimproved lands. State and local forests represent about 10 percent of the Forest Service estimates of the total value of all public forests. For parks and other unimproved lands, the estimates were built up by rough extrapolation of incomplete data on the acreage and unit values of city, county, and state parks (National Recreation Association, *Municipal and County Parks in the United States, 1940, 1942*, pp. 9, 49, 56; *World Almanac, 1948*, p. 288; *1943*, p. 493), adjusted to eliminate improvements in the case of urban parks on the assumption that these represented half of the \$2 billion total for such parks in 1946; and to eliminate improvements and forested lands from the county and state parks. In summary, the estimates for parks and other unimproved lands in 1946 comprise \$1 billion for city parks, \$50 million for county parks, and \$10 million for state parks. The \$750 million for 1939 is more largely a guess guided by data in the sources cited above. For public school endowment lands (such as school-owned Section 16 lands in downtown Chicago) the estimates

are rough guesses based on Illinois state school reports and other scattered data.

Subsoil assets. Rough estimates related to the federal estimate (see text).

Collectors' items Largely guesses.

Appendix Table 4
Derivation of Estimates of Site Values for State and Local
Government Structures, 1946 and 1939
(millions of dollars)

	December 31, 1946			December 31, 1939		
	Est. hist. cost ^a	Price adj. factor ^b	Adj. value	Est. hist. cost ^a	Price adj. factor ^b	Adj. value
Land in sites	2,800		5,500	2,410		3,580
Residential building sites	100	1.5	150	10	1.0	10
Sites for other structures	2,700		5,350	2,400		3,570
Nonresidential buildings	2,100	2.0	4,200	1,900	1.5	2,850
Sewage disposal & water supply facilities	100	1.5	150	100	1.2	120
'All other' construction	500	2.0	1,000	400	1.5	600

Site values for roads and streets and for emergency public works were not segregated from improvements.

^a From 'Land' column in Appendix Table 3

^b Rough guesses.

Notes on Table 6

As indicated in the text, the source material for these estimates was much less adequate than in other areas and a considerable amount was not published. There has therefore been considerable reliance on informed opinion. Although the various branches of the National Military Establishment report their holdings of ships, aircraft, other munitions and facilities, the reports are usually confidential.

Balance sheet data were obtained for the Navy Department from the Annual Report of the Bureau of Supply and Accounts (*Naval Expenditures*, Navsanda Publication 39). This annual publication contains fairly detailed figures on the Navy property investment at the end of each fiscal year in terms of acquisition cost.

Some of the estimates for the War Department (now split between the Department of the Army and of the Air Force)

were prepared by using data summarized from generally confidential administrative supply control reports. The value of all the aircraft of the Air Force is not published. Estimates were made by multiplying the number of planes on hand as shown in administrative reports by estimated unit costs based on wartime War Production Board records. The value of the federal strategic stockpile was estimated from data on budget expenditures and reports of stocks on hand.

On installations the administrative reports of the Army and Navy, also usually confidential, contain figures in considerable detail. The estimated cost of industrial installations during World War II was reported by company and by plant location by the Civilian Production Administration (War Industrial Facilities Authorized, July 1940-August 1945). An integrated inventory of industrial facilities was also published by the War Assets Administration during April 1948 (*Report on Government-owned Industrial Plants as of September 30, 1947*). Gross valuations and depreciation allowances for RFC industrial facilities were obtained partly from the general compilation for government corporations and credit agencies (*Treasury Daily Statement*, Feb. 17, 1947). The costs of the maritime fleet and facilities deemed to be primarily of military use was built up from cumulative expenditures of the Maritime Commission and War Shipping Administration. These were adjusted to reflect disposals and depreciation on the basis of informed judgments of persons working on the program.

Cumulative budget expenditures for the World War II program were a useful guide to estimates on military assets. The analysis of 'The War Program' (*Budget of the United States Government for the fiscal year ending June 30, 1947*, pp. 751-3) contains estimated expenditures by half-years from the fiscal years 1941-46 for munitions, war construction and non-munitions. The Civilian Production Administration also made detailed estimates of the value of United States munitions output by categories and by months from July 1, 1940 to August 31, 1945 (*The Production Statement*, May 1, 1947).

The Federal Supply System, by a task force of the Commission on Organization of the Executive Branch of the Government, affords a check on the estimates for part of the military assets. It estimates that the three military departments had on hand in storage 'current total inventory' of about \$26.8 billion, of which \$10.6 billion was held by the Navy, \$8.0 billion by the Air Force, and \$8.2 billion by the Army. Reports from the military departments in the Commission's files indicate that these inventory figures included about \$6.8 billion of 'non-expendable' material reported by the Air Force, such as "complete aircraft and complete engines". The date of the inventory was indicated only for the Army (Dec. 31, 1947) and the pricing assumptions were not stated. However, it seems probable that the inventory was at about the end of 1947 and that the prices were on the 'original cost' basis comparable with the prices in the first column of Table 6. Adjusting to eliminate the estimated value of complete aircraft it would seem that while 'other equipment and supplies' in Table 6 are estimated to be about \$24 billion in original prices, the Commission's comparable figure for a year later is about \$22 billion.

Government-owned Nonmilitary Capital Assets
since 1900

Solomon Fabricant
*New York University and
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Assisted by
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STATISTICS ON GOVERNMENT CAPITAL ARE INCOMPLETE IN COVERAGE, not always as accurate as they should be, and often inadequately annotated as to derivation and meaning. Yet, if handled cautiously, they can be turned to good use. They alone indicate the magnitude of government investment and of the existing stock of capital goods under the direct control of government. Compared with corresponding figures on total capital formation and total national wealth, they tell us whether the relative scope of government's direct control over investment and wealth is changing significantly. In combination with statistics on labor and other resources employed by government they measure, more accurately than the usual data on government expenditures, what is going into the production of government services. For these reasons, compilation in organized and summary form of even the crude data on government-owned assets is worth time and effort.

This survey is confined to the nonmilitary capital assets (excluding most inventories) held by the more important classes of governmental units in the United States since about 1900. The paper consists mainly of a summary and supporting tables, to which are appended notes on sources and methods of derivation. Discussion is concentrated on the character and scope of the data and on comparisons with total national wealth. The significance of the trends is to be considered in another report.¹

A COVERAGE

Table 1 combines and summarizes, for selected years, information on nonmilitary capital assets in Tables 2-5 plus the little that is known about the capital assets of county governments.

Military assets held by the War and Navy Departments are not covered because of lack of information. River, harbor, and other waterway improvements under the jurisdiction of the

¹ This survey is part of a study of government employment and related trends in progress at the National Bureau of Economic Research with the aid of a grant from The Maurice and Laura Falk Foundation of Pittsburgh.

Army Corps of Engineers are included, however, as are war plants, cargo ships, and other property in the possession of government corporations and credit agencies. A narrower definition of 'nonmilitary' than we use could be met by excluding most or all of the property of these corporations and agencies.

Completely omitted from these tables, in addition to military capital assets, are: (1) Roads, streets and sewage systems. These are discussed below, and some statistics are assembled in Table 6. (2) Nonschool capital assets of incorporated places with fewer than 2,500 inhabitants, townships, and special districts not covered by the figures for cities of 2,500 and over. Employment figures are a rough clue to the relative size of the assets held by this group of governmental units. In April 1945, 113,000 permanent full-time nonschool workers were employed by small incorporated places, townships, and special districts; 1,390,000 permanent full-time nonschool workers were on the payrolls of all state and local governments. (3) Equipment of federal agencies, except equipment held by the Corps of Engineers, the Reclamation Service, and federal government corporations and credit agencies. The value of the omitted equipment is of the order of \$200 million.² (4) Federal property outside the continental United States. At the opening of the century its value must have been very small. By 1939 it constituted a substantial fraction of all federal property. For example, the Panama Canal—the biggest item of federal property outside the continental United States—was valued in 1939 at a depreciated cost of \$500 million.

Major gaps appear in two series available for at least some of the benchmark years in Table 1: the value of state property in 1902 and of county property after 1912. To make consistent grand totals, we filled these gaps with our best guesses (in parentheses). For no year shown in Table 1 would even very

² The value of equipment seems to be about 10 percent of the value of federal real property: Solomon Fabricant, *Capital Consumption and Adjustment* (NBER, 1938), p. 133; for a general discussion of the kind of information available on governmental capital, see Chapter 7.

wide margins of error around these guesses lead to wide margins of error around the grand totals.³

Inventories held by federal corporations and credit agencies in 1933 and later years could not be completely separated from capital assets held by these units, except in 1945 and 1946. Inventory values are therefore included in our aggregates for all years beginning with 1933. The sums involved are \$2.5 billion in 1945 and \$1.5 billion in 1946. Before World War II, however, the inventories included were far smaller.

B BASIC DATA

The kinds of data we utilized are, first, reports on the value of assets actually held; and second, annual outlays or expenditures on assets added to governmental holdings.

For all classes of assets (except federal waterway improvements and reclamation projects), and for all years possible, the estimates were based directly on the reported values of assets. For other years, estimates were obtained by interpolation or extrapolation of the asset values by means of cumulated outlays. The series for waterways and reclamation projects are estimates of depreciated cost made by applying depreciation rates to actual or estimated annual outlays.

It is well to emphasize the roughness of the data. Comparison of the consecutive reports of a given governmental unit (as reported, for example, in *Financial Statistics of Cities*), usually raises questions concerning comparability and coverage.⁴ The delay in completing the 1937 federal real estate inventory, originally requested for 1936, is also suggestive of the state of governmental records. Nevertheless, the data do stand up to the checks we were able to apply. Whenever both assets and outlay data were available, we compared them, in most cases

³ The guesses account for the following percentages of the grand totals that include them: 1902, 14; 1912, 0; 1922, 5; 1929, 5; 1939, 4; 1946, 3.

⁴ Comparisons of this and other sorts are mentioned in *ibid.*, Chapter 7. The Bureau of the Census usually draws attention to omissions, inconsistencies, and erratic changes in the reports it compiles.

with fairly satisfactory results.⁵ Further, comparison of information from several sources, for example, the data on education in the *Biennial Surveys of Education* and in the *Financial Statistics of States, Cities, and Counties*, showed good conformity. While rough, the basic data are sufficiently complete and consistent to indicate trends and orders of magnitude.

C VALUATION

Several types of valuation underlie the figures: (1) Book values of capital assets of state and local public service enterprises and federal corporations conform, as a rule, to usual business accounting practice: the values represent original cost minus reserves for depreciation. The assets of nonenterprise departments also are sometimes valued on this basis. Our estimates of federal waterway improvements and reclamation projects are depreciated original cost. (2) Capital assets of nonenterprise departments of some (probably most) state and local governments are at original cost, without deduction of any reserves for depreciation. When the value of assets is obtained by cumulating outlays, the basis is essentially similar, namely, original cost before depreciation. (Assets sold, scrapped, or otherwise disposed of are excluded.) (3) Assessed values, reported for federally-owned real estate in the District of Columbia, were raised to 'estimated true values' on the basis of ratios supplied by the assessment authorities. The 'estimated true values' series was then used to interpolate and extrapolate the 1923, 1937, and 1940 real property inventory values and to that extent, therefore, federal real estate in the District of Columbia is on an original, undepreciated, cost basis. To judge from their stability, the 'estimated true values' do not differ very much from book values; the trends before 1923 and after 1940 are therefore essentially trends in book values. In any case, it is quite clear that the 'estimated true values' are not current sales values, as they do not fluctuate with major changes in prices. (4) Finally, the values of assets of some state

⁵ The procedure is illustrated in Table 20 of *ibid.*; see also p. 131.

and local government nonenterprise departments are, as the Bureau of the Census states, simply 'estimates' by the reporting governments. These estimates are probably similar to the stepped-up assessed values just mentioned.

The last two types of valuation inherently involve a process of revaluation of assets even though it may be slow and aimed not at current prices but rather at some trend level of prices. It is apparent, however, that revaluations, and particularly revaluations to reflect appreciation, are sometimes made even in the records constructed in accord with the first two types of valuation. First, revaluations in both the original reports of state and local governments and Census reports on Financial Statistics are sometimes mentioned explicitly. Second, the comparisons of reported assets and cumulated outlays, noted earlier, indicate that such revaluations have been made.⁶ Third, the fact that reports accord with 'usual business accounting practice' does not obviate the possibility of revaluations; on the contrary, it suggests that on occasion changes in values are put into the accounts.

One final point must be emphasized before we sum up the valuation basis of our data. Failure to set up depreciation reserves, in the second type of valuation, means that the reported values are overstatements. But these overstatements lead to no serious *trend* bias. As mentioned, and as is indicated by the definitions of assets and outlays used by the Bureau of the Census and its field staff in gathering reports from state and local governments,⁷ replaced assets or assets otherwise disposed of are eliminated from the reported aggregates.

⁶ See *ibid.*, pp. 129, 131-2.

⁷ See the definitions of terminology in the Census reports, and the Census communication cited by Leo Wolman, *Planning and Control of Public Works* (NBER, 1930), p. 118, note 56.

Even when obsolete assets are not removed from the records, the trend bias is less serious for a group of assets growing rapidly than for one growing slowly. That the aggregate of government-owned nonmilitary assets was expanding rapidly is evident from Table 1—even after reasonable allowance for any trend bias that may affect the part of the assets in Table 1 that are valued in accordance with the second type of valuation and from which retired assets are not excluded.

On the whole, it seems fair to conclude that the aggregate values in Table 1 are a mixture of cost and 'current trend' values, as well as being in part gross and in part net of depreciation. In these respects they are not unique; the values available for private capital assets also are of this kind.⁸

Can we eliminate the effects of changes in prices and express our aggregates in 'constant dollars'? If we recognize that they yield reasonable approximations rather than precise magnitudes, some acceptable computations of relevant price indexes are possible.

INDEXES, 1929 MARKET PRICES: 100

	1902	1912	1922	1929	1939	1946
1 Market price	46	55	94	100	96	133
2 Depreciated cost	45	50	77	87	90	98
3 Simple av. of (1) and (2)	46	52	86	94	93	115

The indexes for 1922 and 1929 are from *Capital Consumption and Adjustment*, p. 186 (cf. *ibid.*, pp. 178 and 237). Extrapolations to 1939 and 1946 follow approximately the procedures that produced the 1922 and 1929 indexes. The estimates for 1902 and 1912 are based on similar calculations by Simon Kuznets, *National Product since 1869*, p. 216, plus price information summarized by W. H. Shaw, *Value of Commodity Output since 1869* (NBER, 1947), p. 294.

The 1946 ratio of market price to depreciated cost is 1.36, lower than the corresponding ratio estimated by Reeve, et al, about 1.48. (The ratio given by Reeve and his associates, which averages about 1.65, is for December 1946. We converted this to a corresponding ratio for the entire year 1946 by applying a correction factor based on indexes of prices and of construction costs.)

As the reader will gather from the preceding discussion, it is not easy to determine with any accuracy what fraction of the aggregate values shown in Table 1 is stated at market price or some approximation to it and what fraction reflects depreciated cost or some approximation to it (such as undepreciated or gross cost). Nor would a rough estimate for a single year be sufficient, since it could hardly be expected to apply to all the years with which we are concerned. It is best, therefore, to present two deflated aggregates. One is derived by using the third price index (except for 1946); the other, by using the second. For 1946 the third price index seems quite inappropriate;⁹ the alternative estimate for 1946 is therefore based on

⁸ Simon Kuznets, *National Product since 1869* (NBER, 1946), pp. 191-3.

⁹ For two reasons: (1) the big changes between 1939 and 1946 are mainly in assets carried on a depreciated cost basis—the assets of federal corporations; and (2) the state and local government assets for 1946 are essentially the 1939 values extrapolated by us to 1946 via cumulated outlays.

the third index for 1939 extrapolated to 1946 via the second. We reach, then, the accompanying results.

	1902	1912	1922	1929	1939	1946
	(billions of dollars)					
Government property in reported values (Table 1)	3.8	7.3	15.4	21.1	30.9	51.1
Government property in 1929 prices, estimated by deflating by:						
An index of prices underlying depreciated cost values	8.4	14.6	20.0	24.3	34.3	52.1
The average of indexes of market prices & of prices underlying depreciated cost values	8.3	14.0	17.9	22.4	33.2	50.6*

* See text for the derivation of this figure.

The alternative deflations yield fairly similar results. All except one of the percentage increases between contiguous years in the original values is reduced; the largest deflation affects (as one would expect) the decade 1912-22. The average annual percentage increase in the 'real value' of government property (excluding military assets) is largest for the seven years ending 1946; the other periods follow in this order: 1902-12, 1929-39, 1912-22, and 1922-29.

Both 1922 and 1946 include a great many assets acquired by the federal government during the two World Wars. We know that in 1923 \$2 billion was written off the value of merchant vessels, and we may expect similar writedowns of the 1946 value of surplus property. When the 1922 estimate of federal property is reduced \$2 billion, to anticipate the 1923 write-down, the average annual rate of growth in real assets during 1912-22 becomes the lowest for any of the periods covered (and the rate for the subsequent period is pushed up correspondingly). By how much the 1939-46 rate would be cut by similar anticipation is not yet clear.

The annual data in Tables 2-5 suggest continued growth at a substantial rate between 1912 and the outbreak of World War I. The preceding figures imply, therefore, an actual net reduction in property values (in constant prices) between 1916 and 1923. Of course, this may reflect some overdeflation. But there is little question that the rate of increase in govern-

ment property between 1916 and 1923 was very small, if not actually negative.

D COMPARISON WITH TOTAL NATIONAL WEALTH

Rough as are the deflated figures for government property, it is interesting to compare them with deflated totals of national wealth (which are just as rough). These are Simon Kuznets' compilations of real estate improvements and equipment, excluding consumer equipment, extended by us with the aid of his net capital formation figures and other estimates to cover all the years of interest to us. Land values are excluded from both sets of figures.¹⁰

	1902	1912	1922	1929	1939	1946
	Billions of 1929 dollars					
Government property	6.7	11.7	15.9	18.9	27.7	45.1
Total wealth (real estate improvements & equipment)	101	155	163	210	208	220
% government is of total	6.6	7.5	9.8	8.8	13.3	20.5
	1902-12	1912-22	1922-29	1929-39	1939-46	
	Percentage changes					
Government property	+75	+36	+19	+47	+63	
Total wealth (real estate improvements & equipment)	+53	+5	+29	-1	+6	

Land was excluded from the government figures with the aid of the 1923 and 1937 federal real property data (see notes to Table 2); and on the assumption that land accounted for 20 percent of the value of state and local government property (see *Capital Consumption and Adjustment*, Table 23, note 1). The estimate of government property in constant prices is the mean of the two estimates that may be derived with the alternative deflators selected earlier. Similarly, the estimate for total wealth in constant prices (excluding land) is the mean of Kuznets' two estimates (based on wealth estimates) in *National Product since 1869*, p. 230, interpolated with the aid of W. H. Shaw's data (*Value of Commodity Output since 1869*, pp. 76-7) to obtain a 1902 figure, and extended by means of Kuznets' estimate of net capital formation, nonwar, excluding inventories and foreign claims (*ibid.*, pp. 46 and 54), to obtain 1929 and 1939 figures. The 1946 estimate is based on an unpublished estimate by Marvin Hoffenberg of private wealth, plus our estimate for government property.

With respect to the general level of the ratios of government to total wealth revealed by this comparison, it may be noted,

¹⁰ The exclusion of land helps to avoid duplication of values in government and private wealth. An example of a duplicated item is the cost of putting in city streets and sewers paid for by special assessment on owners of adjacent property. Assessments of this kind are usually included in the land cost to the private owner, as well as in the cost of streets and sewers to the city government.

first, that inclusion of the value of highways and sewers in the government property total would, of course, raise all the percentages substantially (see below). Inclusion of the property of local governmental units not listed in Table 1 would raise all the percentages somewhat further. Addition of military assets to both numerator and denominator would also work in this direction. The effect might be opposite if all assets were valued on a thorough-going depreciation accounting basis; but it would hardly offset completely the effect of the various additions mentioned.

With respect to the changes in the ratios of government to total property, the sharply upward movement is striking. Only between 1922 and 1929 did the real value of government property fail to rise more rapidly than the real value of nongovernment or total property. This is due to the inclusion, in the 1922 figure for government property, of World War I shipping at its original high cost value minus ordinary depreciation. In 1923 much of this property was written down in value. The 1923 write-down of World War I shipping might be taken into account in computing the percentage change for 1912-22, and its effect removed from the percentage change for 1922-29. When this is done, no period fails to show a relative growth in government property.

E ROADS, STREETS, AND RELATED ITEMS

Roads, streets, and sewage systems are omitted from our aggregates because of lack of adequate data. Nevertheless, because of their importance, it is desirable to glance at the available information (summarized in Table 6).

Some readers may feel that the information on this class of government capital assets is not so inferior in quality to the information available for the classes covered by Table 1 as

	1922	1929	1939	1946
	(billions of dollars)			
Government property (Table 1)	15.4	21.1	30.9	51.1
Roads & streets, excl. land, at depreciated cost (Table 6)	5.1	10.8	16.9	17.5
Total	20.5	31.9	47.8	68.6

to warrant hesitation in including it in the aggregates. Inclusion would yield the accompanying results. Whatever doubts there may be about the accuracy of the total, roads and streets clearly constitute a substantial portion of governmental capital goods, running close to a third, even when the value of the land covered by them is excluded. Addition of sewers and nontoll bridges, items also not covered in Table 1, would still further increase the relative importance of this class of government assets.

F COMPARISON WITH OTHER ESTIMATES

Through 1922 there is information on the value of real property exempt from taxation. Since the preponderant part of tax-exempt real estate consists of government-owned property, we may take the trend in the former to constitute an approximation to the trend in the latter.¹¹ Estimates of tax-exempt property are not entirely independent of estimates of government property, of course, because reports of the latter are sometimes based on assessments; and presumably assessments, especially of government property, are in part based on costs. Nevertheless, we have at least partly independent estimates, and the published sources of the data are quite independent. Comparison is therefore of some value as a rough check on our estimates of government property.¹² There are no startling discrepancies. Indeed, the differences are surprisingly small when we consider the rough character of both series, differences in valuation basis, and the inclusion of private property in the tax-exempt series.

¹¹ The proportion of exempt real estate in New York State, owned by governmental units, was: 1905, 71.6; 1912, 70.8; 1922, 76.2; 1929, 64.1; 1939, 76.8. Computed from annual reports of the New York State Tax Commission.

¹² The value of tax-exempt real estate is from Kuznets' *National Product since 1869*, pp. 201-2. Information on equipment is nonexistent, except for 1922. The figures in parentheses are the best guesses we can make for 1902.

	1900	1902	1912	1922
Tax-exempt real estate, \$ billions	5.4	(6.3)	10.9	18.3
Government property, \$ billions		3.8	7.3	15.4
Ratio of government property to tax-exempt real estate, %		(60)	67	84

The tax-exempt data are available for some earlier years. With the qualifications just noted, they provide a clue to the relative trend of government property before 1900. The suggestion of an upward trend during the last decades of the nineteenth century, as well as in the twentieth century, is interesting. Were tax-exempt real estate compared with total real estate (that is, national wealth minus equipment), the trend in the ratio would be somewhat steeper.

	1880	1890	1900	1902	1912	1922	1929	1939	1946
	Ratio (%)								
Tax-exempt real estate to total national wealth	5.9	6.4	7.3		7.4	7.6			
Government property to total national wealth, excl land, 1929 dollars				6.6	7.5	9.8	8.9	13.2	20.4

The data on tax-exempt real estate and on national wealth are from *National Product since 1869*, pp. 201, 202, and 213.

Comparison of the figures in our tables with those in the paper by Reeve and his colleagues is difficult because of differences in categories and coverage. As nearly as we can make out, our 1946 figure for federal nonmilitary assets is about 10 percent below the depreciated historical cost figure reported by Reeve et al for 1946. One would expect our figure to be a little higher, because it includes several minor components valued at original cost before deduction of depreciation reserves. Our 1946 book value—in part at original cost, in part at depreciated original cost—for state and local assets (excluding roads and streets) is about the same as the original historical cost estimate of Reeve et al, and 44 percent above their depreciated historical cost figure, although it does not cover certain items included by them: sewage systems and assets of small municipalities, townships and certain special districts. Our 1946 figure for roads and streets, depreciated historical cost, is 7 percent above the estimate by Reeve and his associates. Corresponding relations hold for the two sets of 1939 estimates. These comparisons support the impression that our estimates indicate trends more accurately than they do levels.

Table 1

Government Nonmilitary Capital Assets (excluding Roads, Streets,
and Sewage Systems), Continental United States
(millions of dollars)

	1902	1912	1922	1929	1939	1946
Federal						
Total, excl. corporations & credit agencies	615	982	1,397	1,910	4,608	6,250
Corporations & credit agencies	.	...	2,378	135	1,304	16,968
State (nonschool)	(550)	1,003	1,605	2,309	3,217	3,824
County (nonschool)	271	480	(770)	(1,100)	(1,300)	(1,500)
Cities of 2,500 & over (non-school)	1,700	3,413	5,825	9,171	11,935	12,998
Public schools						
Elementary & secondary	602	1,266	3,009	5,734	7,402	9,542
Higher education	85	194	388	666	1,120	
Total	3,823	7,338	15,369	21,116	30,927	51,082

For sources and definitions of all except county data, see supporting Tables 2-5. The county figures for 1902 and 1912 are from the Census reports on *Wealth, Debt, and Taxation* for those years, and are similar in scope and concept to the state and city data in Tables 3 and 4.

Figures in parentheses are exceedingly rough estimates made only in order to obtain the grand totals.

Omitted is nonschool property held by municipalities of less than 2,500 population, townships, and special districts not already covered by the figures for cities of 2,500 and over. Also omitted is a fraction of federally-owned equipment (see Table 2).

Table 2
Federal Government Nonmilitary Capital Assets, Continental United States
(millions of dollars)

June 30	Real prop. in D. C.	Pub. build. outside D. C.	River, harbor, & other waterway improvements	Reclama- tion projects	Other real prop. outside D. C. excl. prop. of corp.	Sub- total (6)	CORPORATIONS AND CREDIT AGENCIES			Total (6)+(7)+(8) (10)	Total (6)+(9) (11)
							Capital assets (7)	Prop. held for sale (8)	Capital assets & inventories (9)		
1902	223	126	259	...	(6)	615	...	...	...	615	
1903		128	271	...	(6)	615	...	...	...
1904		131	276	2			...	...	...
1905		165	293	6			...	...	...
1906		170	303	13			...	...	...
1907		178	328	25			...	...	...
1908		184	338	37			...	...	...
1909		194	355	46			...	...	...
1910		205	383	54			...	...	...
1911		219	401	63			...	...	...
1912	(266)	231	401	73	(11)	982	...	...	...	982	
1913		241	454	80			...	...	...
1914		250	453	89			...	...	...
1915	278	261	486	103	(12)	1,140	...	...	...	1,140	
1916		269	496	111			...	...	...
1917		277	524	117			53	...	...
1918		285	540	118			743	...	...
1919		291	577	124			2,230	...	...
1920	205	294	591	124	(14)	1,319	2,743	...	...	4,062	
1921		300	604	129			2,122	...	...

1922	(310)	303	637	134	(14)	1,397	2,371	7	3,775
1923	317	305	679	138	14	1,453	236	3	1,692
1924		303	712	142			236	4	
1925		305	746	149			202	12	
1926		308	783	153			166	16	
1927		315	819	158			156	21	
1928		323	880	165			147	22	
1929	332	351	931	171	(125)	1,910	112	23	2,045
1930	338	387	996	178			111	23	
1931	333	449	1,067	186			106	43	
1932	333	527	1,133	191	(270)	2,455	93	71	2,619
1933	348	622	1,205	196			81	86	
1934	340	675	1,315	201			72	84	
1935	341	715	1,449	218			125	105	
1936	376	745	1,609	339			151	192	
1937	366	811	1,777	334	624	3,963	224	499	4,686
1938	393	868	1,921	430			395	804	
1939	417	909	2,063	491	(728)	4,608	439	865	5,912
1940	436	956	2,196	568	779	4,934	517	1,175	6,631
1941	442	1,016	2,330	(658)			588	1,802	
1942	450	1,128	2,456	749			798	5,581	
1943	454	1,167	2,576	793			1,600	11,039	
1944	458	1,187	2,620	834			1,614	17,314	
1945	462	1,202	2,646	837					
1946	464	1,213	2,697	887	(989)	6,250			23,218

NOTES TO TABLE 2

COLUMN

- 1 The value of nonmilitary real property in the District of Columbia is derived, in the first place, from assessed values of government property in the District. The 1902 figure was taken from assessment records given in Senate Document 181, 58th Congress, 2d Session. The 1915 and 1920 figures, from the Annual Reports of the Commissioners of the District of Columbia, are stepped up by us from the 2/3 value basis used by the assessor in those years to 'full' value. The 1929 to 1946 figures are from a letter from the Assessor of the District. The 1912 and 1922 figures are straight line interpolations. Assessed values are shown here as of the year preceding that in which they take effect.

The assessed values were then used to interpolate and extrapolate the 1923, 1937, and 1940 inventory cost figures from the following sources: figures for 1923 are given by the Federal Trade Commission in *National Wealth and Income*, those for 1937, in the *Federal Real Estate Inventory* (76th Cong., 1st Sess., House Document 111); and those for 1940, in an unpublished inventory taken by the Public Buildings Administration. Military property was excluded by interpolating and extrapolating the ratios of nonmilitary to total property given in terms of assessed values for 1902 and cost for 1937.

- 2 Real property outside the District of Columbia under the jurisdiction of the Supervising Architect of the Treasury or the Public Buildings Administration. Derived from Real Property reported by the Supervising Architect of the Treasury, 1902-39; and the Public Buildings Administration, 1940-46. Figures for property inside the Continental United States and outside the District of Columbia are given in the reports of the Supervising Architect for 1902-18 and 1920, and in a letter from the Public Buildings Administration, for 1937. For 1933-46, they were estimated by adding to and subtracting from the 1937 figure construction under the Supervising Architect and Public Buildings Administration inside the Continental United States and outside the District of Columbia, stepped up to include the cost of sites. The figures for 1919 and 1921-32 were interpolated by the total value of property reported by the Supervising Architect.

The property consists of post offices, courthouses, custom houses, and miscellaneous buildings. The values are cumulated costs (minus costs of property dismantled or otherwise disposed of), without allowance for depreciation.

- 3 Derived, in the first place, from New Work, Plant, and Equipment reported by the U.S. Engineer Corps for 1929-46. All the figures for 1939-46 are taken directly from the Engineer Corps Annual Reports, as are 'new work' for 1929-38, and 'value of plant' for 1933-38. 'Value of plant' for 1929-32, and 'equipment' for 1929-38, are extrapolated from 1933 and 1939 respectively by 'Value of Plant, Stocks, etc.'. The 1929 total was then extrapolated back to 1822 by cumulated appropriations for 'Rivers and Harbors Improvements', 'Improvement of South Pass, Mississippi River', and 'Construction of Dam No. 2, Muscle Shoals' (House Document 106, 76th Cong., 1st Sess.).

The annual increments in the series thus derived were depreciated on the basis of an 80-year life and a 15 percent salvage value, as given in Reeve et al. The final series therefore represents depreciated cost.

- 4 Derived, in the first place, from figures for 1924-40 on Construction Cost, Plant, and Equipment, extrapolated to 1946, except for 1941, by Gross Construction Costs, and back to 1903, by: 1920-23, Net Investment; 1908-19, Gross Cost of Construction; and 1903-07, Disbursement Vouchers Paid, cumulated. In the absence of data on construction costs, the 1941

figure is a straight line interpolation. All these figures are from the Annual Reports of the Reclamation Service since 1908.

The annual increments in the series thus derived were depreciated on the basis of an 80-year life and a 15 percent salvage value. The final series therefore represents depreciated cost.

- 5 Federal government nonmilitary real property outside the District of Columbia other than that under the Supervising Architect, the Public Buildings Administration, the U.S. Engineer Corps, the Reclamation Service, and government corporations and credit agencies. Figures for 1923, 1937, and 1940 are given in the inventories cited in the note to column 1. Figures for the other years are interpolated and extrapolated by the figures in column 2. Values are 'cost' in the 1937 and 1940 inventories; 'substantially' cumulated original cost without allowance for depreciation, in the 1923 inventory.
- 6 Total of columns 1-5.
- 7 Net book value (gross capital assets minus reserves for depreciation) of business real estate, equipment, vessels, and rolling stock of Federal government corporations and credit agencies. For 1933-44, Annual Reports of the Secretary of the Treasury, especially the 1940 Report, p. 170. Three corporations, the Virgin Islands Co., the Porto Rico Reconstruction Administration, and the Panama Railroad Co., were eliminated from the totals as being outside the Continental United States. The 1937 figure for the U.S. Maritime Commission, not given in the Treasury reports, is taken from Senate Document 172, 76th Congress, 3d Session: Financial Statistics of Certain Government Agencies. The figures for the Inland Waterways Corporation, 1924-32, and Federal Land Banks, 1928-32, are calendar year assets from the Senate Document cited. Those for the Federal Land Banks, 1922-27, are from the *Annual Reports of the Federal Farm Loan Board*. Those for the U.S. Shipping Board, from the Board's annual reports, represent depreciated original cost through 1922, appraised value in later years. The figures for the U.S. Housing Corporation are cumulated construction cost for 1919 and 1920, and straight line interpolations for 1921 and 1922 between the figure for 1920 and zero for 1923; data are for calendar years as given in Chawner, *Construction Activity in the United States, 1915-1937*.
- 8 Book value of real estate and other property held for sale. 'Other property' held for sale includes some commodity inventories. For 1935-44, the data are from *Annual Reports of the Secretary of the Treasury*. The U.S. Maritime Commission figures represent 'other assets'. Agencies cited above as 'outside the Continental United States' are excluded. Figures for 1924-32 are for the Federal Land Banks; and those for 1932-34, for the Federal Land Banks and the Reconstruction Finance Corporation. These are calendar year data from the Senate Document cited above and the *Annual Reports of the Federal Farm Loan Board*. The figures for 1922-25 are 'forced sale value' of land, structures, and equipment held for sale by the U.S. Shipping Board; data are from its *Annual Reports*.
- 9 Book value of land, structures, equipment, plus inventories of commodities, supplies and materials, minus reserves. Corporations outside the Continental United States are excluded. The value of inventories included is (millions): 1945, \$2,499; 1946, \$1,452. Data are from *Annual Reports of the Secretary of the Treasury, 1945-47*, especially 1947, pp. 462-3.

Table 3
State Government Capital Assets (excluding School Property)
(millions of dollars)

Dec. 31	Value	Dec. 31	Value	Dec. 31	Value	Dec. 31	Value	Dec. 31	Value
1912	1,003	1919	1,399	1926	1,927	1933	2,678	1940	3,343
1913		1920	1,456	1927	2,073	1934	2,717	1941	3,451
1914	1,183	1921	1,526	1928	2,197	1935	2,804	1942	3,518
1915	1,227	1922	1,605	1929	2,309	1936	2,880	1943	3,563
1916	1,263	1923	1,690	1930	2,435	1937	2,968	1944	3,602
1917	1,301	1924	1,766	1931	2,562	1938	3,085	1945	3,661
1918	1,349	1925	1,832	1932	2,647	1939	3,217	1946	3,824

Nonschool assets for 1912 are from *Wealth, Debt, and Taxation, 1913* adjusted with the help of 1914 data to cover the State of Pennsylvania, trust and investment funds for all the states, and libraries (see *Financial Statistics of States, 1915* for 1914 data). Nonschool assets for 1914-17 and 1923-30 are given in *Financial Statistics of States*. For 1918-22, the asset figures are interpolated by cumulated nonschool, nonhighway outlays partly from *Financial Statistics of States*, partly estimated by us. The extrapolation from 1931-46 is also by cumulated nonschool, nonhighway outlays partly from the *Financial Statistics*, partly estimated as follows: outlays other than roads and schools, for 1932-35, are estimated by interpolation via Department of Commerce figures on construction expenditures of states and counties (excluding expenditures for highways) as given in Chawner, *Construction Activity in the United States, 1915-1937*, Tables 3a and 41; outlays for 1941-46 are stepped up by 1940 and 1942 ratios to offset the omission first of alcoholic beverage monopoly systems, then of all other state public enterprises. All report year figures, except the figure for 1912, have been converted by us to calendar years.

Value of property is essentially cumulated cost with little or no allowance for depreciation, except in the case of most public service enterprises. Assets covered are land, buildings, and equipment (including rolling stock); toll bridges are included, but public roads and free bridges are excluded.

Table 4
City Government Capital Assets (excluding School Property)
Cities of 2,500 and over
(millions of dollars)

Dec. 31	Value	Dec. 31	Value	Dec. 31	Value	Dec. 31	Value	Dec. 31	Value
1902	1,700	1911	3,246	1920		1929	9,171	1938	11,739
1903	1,798	1912	3,413	1921	5,606	1930	10,102	1939	11,935
1904	2,207	1913		1922	5,825	1931	10,737	1940	12,461
1905	2,325	1914	4,168	1923	6,050	1932	10,905	1941	12,615
1906	2,464	1915	4,401	1924	6,399	1933	10,996	1942	12,716
1907	2,642	1916	4,563	1925	6,901	1934	11,119	1943	12,789
1908	2,791	1917	4,692	1926	7,553	1935	11,267	1944	12,836
1909	2,913	1918	4,878	1927	8,291	1936	11,411	1945	12,899
1910	3,126	1919		1928	8,847	1937	11,595	1946	12,998

Nonschool assets of cities with populations over 30,000 for 1902-11, 1914-18, and 1923-31, and of cities over 100,000 for 1936, are given in various issues of *Financial Statistics of Cities* (the 1936 figure is partly estimated for New York, Dayton, and Fort Wayne). Nonschool assets of cities over 2,500 for 1912 are given in *Wealth, Debt, and Taxation, 1913*.

Estimates for 1921-22, 1932-35, and 1937-46 are based partly on cumulated outlays (other than on roads and streets, sewers, and schools), from the same source, and partly from estimates as follows: the 1921 figure was given for only 183 out of 253 cities, and had to be estimated for the others by the 1922 ratio of the outlays of the 253 cities to those of the 183 cities; the 1933-37 figures were raised to include construction expenditures of the Metropolitan Water District of Southern California directly assessable against the city of Los Angeles (see Department of Commerce, *Fluctuations in Capital Outlays of Municipalities*).

For 1922 and 1940-46 outlays for sewers were estimated from outlays for sanitation by the ratios in 1923 and 1939. The 1941 figure for cities 100,000 and over is partly estimated to add counties in cities over 300,000 which are included in earlier years. Figures for 1942 and later years are for cities 25,000 and over, and do not include any overlying areas. Outlays for 1937-46 are cumulated at about half their value in accordance with the 1931-36 ratio of changes in assets to cumulated outlays. Using the 1912 ratio of per capita outlays in cities over 2,500 to per capita outlays in cities over 30,000, and the ratios of population in cities over 2,500 to that in cities over 30,000, the figures were raised to include all cities over 2,500. Figures through 1941 cover overlying areas and counties in cities with more than 300,000 inhabitants as well as the cities themselves.

Value of property is essentially cumulated cost with little or no allowance for depreciation, except in the case of most public service enterprises. Assets covered are land, buildings, and equipment (including rolling stock); streets and sewer systems are excluded.

Table 5
Government Controlled Schools: Value of Property
(millions of dollars)

School Year Ended in	Element & Secondary Schools	Institutions of Higher Education	Total	School Year Ended in	Element & Secondary Schools	Institutions of Higher Education	Total
1900	550	69	619	1923			
1901	572			1924	3,745	482	4,227
1902	602	85	687	1925	4,252		
1903	644			1926	4,677	616	5,293
1904	685			1927	5,105		5,783
1905	733			1928	5,487	734	6,221
1906	783			1929	5,794		6,491
1907	859			1930	6,211	807	7,019
1908	945			1931	6,453		7,314
1909	968			1932	6,582	900	7,482
1910	1,091			1933	6,612		7,536
1911	1,222			1934	6,625	947	7,572
1912	1,266	194	1,460	1935	6,637		7,586
1913	1,347			1936	6,731	982	7,695
1914	1,445			1937	6,925		7,945
1915	1,567			1938	7,115	1,077	8,192
1916	1,662			1939	7,402		8,563
1917	1,826			1940	7,635	1,238	8,873
1918	1,984			1941			
1919				1942	7,801		
1920	2,410			1943			
1921				1944	7,928		
1922	3,009	385	3,393	1945			
				1946			9,542

Annual Reports and Bulletins of the U. S. Office of Education, 1900-15, and for 1916 on, *Biennial Surveys of Education*, except for 1946, with interpolations for 1916 and most odd-years beginning with 1917 based on value of school assets reported in *Financial Statistics of Cities and States*. The 1946 figure is extrapolated from 1940 by estimated total school outlays based on school outlays given in *Financial Statistics of States, of Cities, 1938-1946*, and of *Counties, 1942-1946*, and *Government Finances, 1942*.

Property includes "libraries, scientific apparatus, machinery, furniture, grounds and buildings", and is presumably valued at cost without allowance for depreciation. Libraries of universities and colleges in 1912 were estimated from separate figures for libraries in 1902, and libraries, machinery, furniture, etc., in 1902 and 1922.

There is probably a slight upward bias in the figures for higher education because of increasing coverage up to 1922. In addition, the 1900, 1902, and 1912 figures may omit small amounts for libraries, machinery, furniture, etc., of professional schools reporting separately from universities, and may omit altogether some public professional schools not attached to universities.

Table 6
Value of Roads, Streets, and Other 'Public Improvements'
(excluding Land)
(millions of dollars)

	1907	1912	1922	1929	1939	1946
Rural roads						
Depreciated cost			2,700	6,600		
Depreciated reproduction cost			6,000			
City streets						
Depreciated cost		1,700	2,400	4,200		
Depreciated reproduction cost	645		2,750			
Roads & streets, total						
Depreciated cost			5,100	10,800	16,900	17,500
Depreciated reproduction cost			8,750			
Water mains & sewers						
Depreciated reproduction cost	455		2,500			
Highway bridges & other improvements						
Depreciated reproduction cost	238		1,500			

The 1907 figures are from *Financial Statistics of Cities, 1907*, stepped up to cover all cities. It is not clear whether land values are excluded. The figure for water mains and sewers covers sewers only. Toll bridges are excluded.

The 1922 figures for depreciated reproduction costs are those of the Federal Trade Commission, *National Wealth and Income*, pp. 40-3. Land values, as estimated by the Commission, are \$850 million for rural roads and \$8,250 million for city streets.

The other figures are derived from estimates of 'unamortized cost at beginning of year' of various types of roads and streets as given in *Public Aids to Transportation*. Federal Coordinator of Transportation, 1940. We included the cost of grading and draining unimproved roads, shown separately in the same source. Extrapolations of the Coordinator's figures through 1946 are based on total road construction and the depreciation rates used by the Coordinator.

Public Aids to Domestic Transportation (79th Cong., 1st Sess., House Document 159) gives the depreciated cost of all public roads at the end of 1920 as \$5.4 billion; \$3.8 billion for 1920 is the figure we estimate. Most of the difference is due to the method of estimating the value of city streets.

A rough estimate of the value of public roads in constant (1917-20) prices can be derived from mileage and construction cost data collected by the Bureau of Public Roads. So calculated, our estimate (without allowance for depreciation) is \$8 billion for 1904 and \$28 billion for 1945. It is not clear whether the construction cost of surfaced roads includes the original cost of grading and draining before surfacing. If it does not, the rate of growth is understated. Mileage of public roads, by type, for 1904 is given in Bureau of Public Roads *Bulletin 41* (1909), and for 1945 in *Highway Statistics, 1945*. The cost figures are from *Public Roads*, December 1920.

Foreign Investment Aspects of Measuring National Wealth

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PROBLEMS IN MEASURING NATIONAL WEALTH created by the international ownership of assets and claims on assets could be solved by adopting any one of several concepts of what constitutes 'national' wealth. The definitions that have sufficient merit to justify consideration are:

- 1) All the real and intangible assets within the geographic frontiers of the country.
- 2) All the assets owned by persons ordinarily resident in the country. This could be varied by including the assets of citizens residing abroad. It excludes, of course, assets within the country but owned by nonresidents.
- 3) All assets in the country, plus assets abroad owned by residents (or, alternatively, by residents plus nonresident nationals).¹

Offhand, the first definition might seem the most reasonable. Probably the most understandable to an average layman, it has the additional merit of simplicity coupled with the technically desirable quality that it would permit a complete cross-classification between types of asset and types of owner.² Foreigners would become merely one of the various classes of owners of the national wealth. For some purposes this concept is superior. Moreover, in times of national emergency, such as war, obviously the whole productive system is, generally speaking, available for use, even if part is owned by foreigners. In judging the total economic impact of a nation, therefore, either in an absolute sense or, even more, in relation to other countries, the total resources within that country, at least, ought to be considered.

It might be argued, in accordance with definition 3, that foreign assets owned domestically ought also to be added in. This would be comparable to what one student of national income has termed "net taxable income".³ After all, the gov-

¹ The converse of definition 3, viz, all assets physically in the country minus claims of nonresidents against such assets, seems to have little merit.

² Aside from the general problems created by the existence of debt, equities, and other indirect forms of claims on wealth.

³ Phyllis Deane, 'Measuring National Income in Colonial Territories', *Studies in Income and Wealth, Volume Eight* (NBER, 1946), p. 152.

ernment of a country has the legal power to tax property, and income therefrom, situated within its borders, as well as the property and income of its residents wherever situated or derived.

As indicated above, this concept could be broadened to include the income and property of nationals residing abroad. In the United States, at least, such income, except earned income, is subject to federal income tax. Even earnings are taxable if received from a federal agency.

In this paper the second concept, excluding the property of nonresident citizens, has been adopted, primarily because it is consistent with the definitions of national income and product employed in the official statistics prepared by the Department of Commerce. With respect to property income, but not with respect to wages and salaries,⁴ those statistics cover income received by residents from abroad and exclude income paid by residents to nonresidents, including nonresident citizens. It seems logical, therefore, to include in national wealth only assets the income from which would, by the accepted definition, be included in national income. For the sake of consistency, nonincome-producing assets have been treated similarly.

A GEOGRAPHIC COVERAGE

The United States, for purposes of this paper, includes territories and possessions, except the Philippine Islands, as well as the continental United States. With certain exceptions, notably the Virgin Islands and the Panama Canal Zone, the area covered is conterminous with the customs area of the country. For obvious reasons, this is the only acceptable definition for balance of payments purposes, and all data on the interna-

⁴ Income from personal services is included in the United States national income if two of the three following factors are domestic: place where the work is performed; location of the employer; usual residence of the employee.

Canadian residents, for instance, working in the United States are included in the national income as far as their wages and salaries are concerned. Their property income, however, is not included, and they are considered foreign residents for purposes of this study.

tional investments of the United States have been collected in connection with or closely related to balance-of-payments statistics and analysis.

Except for 1946, to treat the territories as 'foreign' would probably not give figures greatly different from those presented here, although it would probably add a few hundred million dollars to United States assets abroad. By the end of the war, however, government installations alone in Alaska, Hawaii, Puerto Rico, and the Canal Zone must have had a cost value of at least two or three billion dollars, while the assets of residents of these areas in the United States were relatively small. The market value of government, especially military, installations is a relatively meaningless concept. Surplus property overseas has been sold at an average of about 20 percent of cost; on the other hand, if offered for sale, the Panama Canal would undoubtedly fetch several times what it cost to build.

B ASSETS VS. CLAIMS

Only a small fraction of the foreign investments of and in the United States consists of physical assets located in one country but owned by residents of another. The totals of both foreign investments in the United States and United States investments abroad are made up chiefly of claims of various kinds: holdings of corporate stocks; bonds and other corporate debt; bonds, mortgages, notes and other noncorporate private debt; obligations of governments—federal, provincial, and municipal; bank deposits and other essentially banking claims, such as acceptances; and miscellaneous items—interests in trusts and estates, insurance policies and annuities, and other minor items (Table 1).

A word concerning the treatment of direct branches of corporations is in order; i.e., the extension of corporate enterprise into a country other than one under the laws of which the company is incorporated. Direct branches are of two kinds. A United States corporation, for instance, may conduct most of its business domestically but have a foreign branch or

Table 1

United States Assets Abroad and Foreign Assets in the United States, 1929, 1939, 1946 (millions of dollars)

	U.S. Assets Abroad			Foreign Assets in U.S.			Net U.S. Assets Abroad (+) or Foreign Assets in U.S. (-)		
	1929	1939	1946	1929	1939	1946	1929	1939	1946
Total	20,970	14,100	24,840	9,235	13,055	16,680	+11,735	+1,045	+8,160
Currency & bullion			275		220	620		-220	-345
Deposits	210	400	450	1,710	3,430	5,130	-1,500	-3,030	-4,680
Other short term claims	1,565	650	980	1,365	365	2,555	+200	+285	-1,575
Long term claims, total	8,110	3,415	8,580	1,325	2,715	2,330	+6,785	+700	+6,250
Bonds, payable in U.S. \$	6,465	1,685	1,535	575	700	840	+5,890	+985	+695
Other bonds	910	915	1,395				+910	+915	+1,395
Other long term claims	735	815	5,650	750	2,015	1,490	-15	-1,200	+4,160
Stocks, total	10,050	8,450	10,770	4,400	5,890	5,570	+5,650	+2,560	+5,200
Direct investments, subsidiaries	5,530	4,760	6,050	1,100	2,245	2,060	+4,430	+2,515	+3,990
Direct investments, branches	2,320	1,990	2,220	300	545	500	+2,020	+1,445	+1,720
Portfolio investments	2,200	1,700	2,500	3,000	3,100	3,010	-800	-1,400	-510
Assets directly owned, total	1,035	1,185	3,785	435	435	475	+600	+750	+3,310
Realty	750	850	2,550	85	85	125	+665	+765	+2,425
Movable goods	285	335	1,235	350	350	350	-65	-15	+885

For basis of valuation, see text.

branches. More commonly, however, a corporation may be organized in the United States for the sole purpose of engaging in business abroad; frequently the name of the company is in the language of the country in which it operates, though the company may be incorporated, say, in Delaware. Legally, the gross assets of a foreign branch are the property of the home office and the liabilities of the branch are liabilities of the company as a whole and not merely of the branch. Therefore, the gross assets of such branches could be treated as United States investments abroad, and their liabilities as foreign investments in (i.e., claims on) the United States. But as a practical matter, it is more convenient, as well as more logical from an economic point of view, to consider the branch as if it were a separate corporate entity, i.e., a foreign subsidiary of the home office. Such a procedure was followed in this paper; the net equity in the branch is treated in the same manner as the ownership of the stock of a foreign subsidiary corporation.

C PROBLEMS OF VALUATION

Cost values are not available for most foreign investments in or of the United States, and market values are, at best, only approximately correct. The latter were computed only for publicly held securities: bonds and preferred and common stocks. For most other assets with a fixed face value, such as bank deposits, mortgages, and notes, the stated value (probably also usually the cost) was used. The value of interests in trusts or estates was obtained by discounting estimated future earnings, using a rate of 4 percent and, if necessary, actuarial tables.⁵

Government installations are usually at original cost minus an arbitrary allowance of 20 percent for depreciation; market value, as previously indicated, would mean little. Had depreciated replacement value been used, an estimate of price increases from the time the assets were procured to the end of

⁵ *Census of Foreign-Owned Assets in the United States* (Treasury Department, 1945), pp. 57-8.

1946 would be added to the estimated depreciated original cost.

Direct investments, i.e., controlled enterprises, were entered only at book value, defined to include equity in common stock plus surplus (or minus deficit), the face value of preferred stock, bonds, or other securities, and the face amount of inter-company debt. Except for markups, writeoffs, and operating losses, this probably closely approximates cost. Since most of these direct investments are 100 percent owned by parent companies, there is no market for their securities, and it was impracticable to compute a market value.

Interests in controlled enterprises are shown net, that is, any amounts due a subsidiary by its parent company are not treated as a separate claim on the country of the parent, but are deducted from the equity of the parent in the subsidiary. In another respect, however, the figures are gross; the Canadian subsidiary of a foreign-controlled United States company is considered an American investment in Canada, while the foreign equity in the consolidated assets of the United States company (including its Canadian assets) is counted as a foreign investment in the United States.

1 *Cost vs. Market Value*

With the qualified exception of direct investments, it was practicable to estimate cost value only for investments in foreign dollar bonds and certain government assets left over from the recent war. The values computed by various methods of appraisal of foreign dollar bonds are shown in Table 2.

Table 2
United States Holdings of Foreign Dollar Bonds, 1929, 1939, 1946
(millions of dollars)

<i>Method of valuation</i>	<i>1929</i>	<i>1939</i>	<i>1946</i>
Market value	6,465	1,685	1,535
Value in 1939 prices	4,510	1,685	1,235
Cost	6,475	2,430	1,805
Par value	6,770	2,525	1,885

The difference between cost and market in 1939 or 1946 should not be taken as a measure of the total losses to American

purchasers of foreign dollar bonds. After the wave of defaults that began in 1931, many of these bonds were repatriated at a fraction of their original cost, or the principal was reduced by agreements with the bondholders.

Realty and movable goods owned by the government and remaining in foreign countries at the end of 1946 were valued at cost: \$2,125 million and \$4,450 million respectively. To obtain an approximate market value, realty was arbitrarily depreciated to \$1,700 million, and movable goods were entered at one-fifth of their cost, or \$900 million, the value indicated by the rate of recovery on goods disposed of by 1946.

2 *Fluctuations in Market Value*

As already indicated, market values could be estimated only for publicly held stocks and bonds, i.e., portfolio holdings. Foreign holdings of United States securities were based on Standard and Poor's corporation indices of security prices for corporate stocks for all three years and for corporate bonds in 1929 and 1939, and the ratio of market price to par of corporate bonds on the New York Stock Exchange in 1939 and 1946. The market values of foreign dollar bonds were estimated, on an issue by issue basis, for 1939 and 1946, and on a large number of issues for 1929. Since the items on which 1939 market prices could be calculated for 1929 and 1946 were few, the relevant data are presented separately in Table 3 and notes to Appendix Tables 1-6; Table 1 and the complete divisions in Appendix Tables 1-6 are in current values only.

Table 3
Holdings of Marketable Securities, Current and 1939 Prices,
1929 and 1946
(millions of dollars)

	Current Prices		1939 Prices	
	1929	1946	1929	1946
U.S. holdings of				
Foreign dollar bonds	6,465	1,535	4,510	1,235
Other foreign bonds	910	1,395	865	1,195
Foreign stocks	2,200	2,500	1,700	1,890
Foreign holdings of				
U.S. bonds	575	840	530	730
U.S. stocks	3,000	3,010	1,800	2,300

D ANALYTICAL NOTES

The figures presented here do not alter significantly the net creditor position of the United States as depicted in Department of Commerce studies. The net creditor position was largest in 1929, at the end of the post-World War I lending era, with net assets of \$11,735 million. The figure was probably somewhat higher at the end of 1930. At the end of the 1930's the assets on the two sides of the account were about equal because of defaults and repatriation of United States holdings of foreign dollar bonds throughout the decade and the large scale influx of European capital in the latter part. Despite the continued growth of foreign short-term balances in the United States, a new creditor position emerged in 1946 from the post-war program of government loans to foreign countries, the net purchase of about \$480 million of Canadian securities during the war, and an increase in the value of United States direct investments abroad, chiefly because of reinvested earnings.

The main differences between the figures based on the Treasury censuses and the various estimates of the Commerce Department are two: the compulsory nature of the Treasury censuses uncovered assets on both sides of the account not included in Commerce estimates; and the concept of 'assets' is broader than that of 'investments', including holdings of non-profit institutions, real property held for personal use, and movable goods. In addition, the Commerce Department has never considered property held abroad by the government for its own use an investment.

1 *Comparison with Balance-of-Payments Data*

For comparative purposes, the net changes in foreign investments in and of the United States are shown in Table 4 with the corresponding net capital movements recorded in the official balance-of-payments statistics. No attempt was made to reconcile the differences, which are due chiefly to the following factors:

- a) Changes in the value of investments not recorded in the balance of payments, such as those arising from undistributed earnings of direct-investment enterprises, changes in market value, and changes in exchange rates.
- b) Errors and omissions in balance-of-payments data.
- c) Differences in concept mentioned above, especially concerning government property and holdings of nonprofit institutions. Expenditures for the acquisition of such property are reflected in the current account in the balance of payments.
- d) Changes due to international migration, i.e., change in the residence of the owners of the assets.
- e) Changes due to improvements in methods of estimating, particularly the wider coverage of the Treasury censuses.

Table 4
Net Changes in International Investments and
Net Capital Movements, 1930-39 and 1940-46
(millions of dollars; increase +, decrease —)

	Net change in investment	Net capital movement	Net difference
	1 9 3 0 - 1 9 3 9		
U.S. investments abroad			
Short term	-725	-1,557	+832
Long term, direct	-1,100	+435	-1,535
Other long term	-5,195	-1,309	-3,886
Foreign investments in U.S.			
Short term	+940	+357	+583
Long term, direct	+1,390		+1,390
Other long term	+1,490	+1,392	+98
	1 9 4 0 - 1 9 4 6		
U.S. investments abroad			
Short term	+655	+526	+129
Long term, direct	+1,520	-40	+1,560
Other long term	+8,565	+5,187	+3,378
Foreign investments in U.S.			
Short term	+4,290	+4,354	-64
Long term, direct	-230	-228	-2
Other long term	-435	-611	+176

2 Geographic Distribution

No attempt was made to distribute the figures used in this paper by foreign country of location or ownership of assets.

The general picture of the distribution can be obtained, however, from the reports of the Treasury censuses and the various studies by the Department of Commerce listed in the Bibliography.

3 *Industrial Distribution*

The industrial distribution of the 'debtors' with respect to foreign assets in the United States is fairly well established, and the figures in the accompanying tables are believed reasonably reliable. Not so with respect to American assets abroad, where little is known about the industrial classification of corporate holders of foreign wealth, except holders of direct investments. Although this information could have been obtained from the Treasury Census on form TFR-500, it was not tabulated except for investments in controlled enterprises. Probably, however, most corporate holdings of foreign portfolio securities are held by credit institutions, chiefly banks and insurance companies, while most 'other short term claims' are probably held by manufacturing and trade groups. Direct corporate holdings of real assets, except for branches, are relatively small.

APPENDIX

SOURCES

The basic data for the estimates in this paper were taken from the Treasury Department *Census of Foreign-Owned Assets in the United States* (1945) and the *Census of American-Owned Assets in Foreign Countries*. The Treasury figures were adjusted to 1929, 1939, and 1946 on the basis of the various studies by the Department of Commerce (see the Bibliography), material in Department of Commerce files, and the capital movement statistics collected regularly by the Treasury Department and published in its monthly *Bulletin*.

For data on the United States balance of international transactions the following Department of Commerce sources were used: 1930-39, *The United States in the World Economy*

(1943); 1940-44, *International Transactions of the United States During the War, 1940-45* (1947); 1945 and 1946, estimates since published in the *Survey of Current Business*, June 1948, and to be published in the *Balance of International Payments of the United States, 1946-48*.

United States Assets Abroad

- 1 Foreign currency and bullion
 - 1929 and 1939: no data
 - 1946: reported holdings of federal agencies
- 2 Deposits
 - 1929: based on Department of Commerce questionnaire to banks
 - 1939: based on bank deposits (p. 39) and brokerage balances (p. 35) as reported in *Treasury Bulletin*, March 1940, raised on the basis of Treasury Census, TFR-500
 - 1946: based on items noted above, *Treasury Bulletin*, May 1947, pp. 97 and 99, adjusted as for 1939
- 3 Other short term claims
 - 1929: based on Commerce Department questionnaire to banks
 - 1939: based on *Treasury Bulletin*, March 1940, p. 39, raised on the basis of Treasury Census, TFR-500
 - 1946: based on *Treasury Bulletin*, May 1947, p. 99, adjusted as for 1939
- 4 Dollar bonds
 - 1929: Department of Commerce estimates
 - 1939 and 1946: Department of Commerce estimates, adjusted on the basis of Treasury Census, TFR-500
- 5 Other foreign bonds
 - 1929: based on Treasury Census, TFR-500, adjusted back to 1929 for changes in market price and for estimated changes due to immigration
 - 1939 and 1946: based on Treasury Census, TFR-500, adjusted to 1939 and 1946
- 6 Other assets
 - 1929, 1939, and 1946: based on Treasury Census, TFR-500, adjusted for estimated changes due to immigration and omissions
- 7 Direct investment subsidiaries and branches
 - 1929: based on Commerce Department estimates for 1929, adjusted for omissions and for the division between subsidiaries and branches as indicated by the Treasury Census, TFR-500
 - 1939: based on Treasury Census, TFR-500, for 1943, adjusted to 1939 (a) for new investments and liquidations, reinvested earnings, intercompany accounts, and (b) to eliminate holdings of persons immigrating after 1939
 - 1946: based on Treasury Census, TFR-500, for 1943, adjusted to 1946 as for 1939, except that an allowance was made for emigration during 1946

- 8 Portfolio investments in corporate stocks
1929: based on Treasury Census, TFR-500, for 1943, adjusted to 1929 for estimated holdings of immigrants and changes in security prices
1939 and 1946: based on Treasury data, adjusted for security transactions, price changes, and immigrant holdings
- 9 Realty
1929: based on Treasury Census, TFR-500, adjusted for immigrant holdings
1939: based on Treasury Census, TFR-500, unadjusted
1946: based on Treasury Census, TFR-500, unadjusted, and reports of governmental agencies with installations abroad
- 10 Movable goods
1929: based on Treasury Census, TFR-500, adjusted for immigrant holdings
1939: based on Treasury Census, TFR-500, unadjusted
1946: based on Treasury Census, TFR-500, unadjusted, and the Report to Congress on Foreign Surplus Disposal, Office of the Foreign Liquidation Commission, July 1947

Foreign Investments in the United States

- 1 United States currency
1929: not estimated separately
1939 and 1946: Department of Commerce estimates
- 2 Deposits
1929: based on Commerce Department questionnaire to banks
1939: based on bank deposits (p. 38) and brokerage balances (p. 35) as reported in *Treasury Bulletin*, March 1940, raised on the basis of Treasury Census, TFR-300
1946: based on items noted above from *Treasury Bulletin*, May 1947, pp. 98 and 100, adjusted as for 1939
- 3 Other short term claims
1929: based on Commerce Department questionnaire to banks
1939: based on *Treasury Bulletin*, March 1940, p. 38, raised on the basis of Treasury Census, TFR-300
1946: based on *Treasury Bulletin*, May 1947, p. 100, adjusted as for 1939
- 4 Bonds
1929: based on Cleona Lewis, *America's Stake in International Investments*
1939 and 1946: Department of Commerce estimates, adjusted on the basis of Treasury Census, TFR-300
- 5 Other claims
1929: based on Cleona Lewis, op. cit.
1939 and 1946: based on Treasury Census, TFR-300, adjusted for immigrant holdings
- 6 Direct investment branches and subsidiaries
1929: based on Cleona Lewis, op. cit.; branches and subsidiaries were not estimated separately
1939 and 1946: based on Treasury Census, TFR-300, for 1941, adjusted to 1939 and 1946 for new investments and liquidations, reinvested earnings, and immigrant holdings

7 Portfolio investments in corporate stocks

1929: based on Cleona Lewis, op. cit.

1939 and 1946: based on Treasury Census, TFR-300, for 1941, adjusted to 1939 and 1946 for changes in security prices, transactions, and immigrant holdings

8 Real estate

1929, 1939, and 1946: based on Treasury Census, TFR-300

9 Inventory

1929, 1939, and 1946: based on Treasury Census, TFR-300

DETAIL TABLES

The six detail tables contain data for Exhibits I and II. Line 6 of Exhibit I and lines I 7, II 7, and III 6 of Exhibit II are made up of the data in Tables 1, 2, and 3. Column 8 of Exhibits I and II is made up of the data in Tables 4, 5, and 6.

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United States Treasury Department:

Census of Foreign-Owned Assets in the United States (1945)*Census of American-Owned Assets in Foreign Countries* (1947)

Cleona Lewis:

America's Stake in International Investments (Brookings Institution, 1938)*Debtor and Creditor Countries: 1938, 1944* (Brookings Institution, 1945)

Appendix Table 1
United States Assets Abroad, Market Value, 1929, 1939, 1946
(millions of dollars)

	TOTAL	CREDIT INSTITUTIONS Private Fed.	PUBLIC UTIL.	T Y P E O F H O L D E R					FARMS	Private nonprofit	Fed.	HOUSE- HOLDS *
				MFG., ETC.	M I N E S			O T H E R B U S I N E S S				
					1	9	2						9
1 Total	20,970	3,535	1,090	5,380	460		1,370	390	685	..	8,060	
2 Foreign currency & bullion	..	..	..	..	..	..	..	..	..	..	..
3 Deposits	210	85	..	..	..	..	..	..	..	..	125
4 Other short term claims	..	..	..	..	..	..	..	..	..	..	..
5 On foreign governments	..	..	..	..	..	..	..	..	..	..	..
6 On other foreigners	1,565	..	..	800	..	..	300	..	25	..	440
7 Long term claims	..	..	..	..	..	..	..	..	..	..	..
8 Dollar bonds	6,465	2,275	..	..	..	..	570	..	390	..	3,230
9 Other foreign bonds	910	355	..	..	..	..	90	..	65	..	400
10 Other liabilities ^a	735	25	..	150	..	..	75	..	..	..	485
Stocks	..	..	..	..	..	..	..	..	..	..	..
11 Direct investment, subsidiaries ^a	5,530	660	1,090	4,130	460	170	390	160	..	790		
12 Direct investment, branches	2,320	135	..	275	..	140	..	40	..	1,610		
13 Portfolio investments	..	..	..	..	..	..	..	..	..	..
14 Direct foreign assets	750	..	..	25	..	25	..	5	..	695	
15 Real estate	285	..	..	..	..	..	..	..	..	285	
16 Movable goods	..	..	..	..	..	..	..	..	..	..
Only items 6, 7, and 11 can be estimated in 1939 prices, and only item 6 at cost, as follows:												
In 1939 prices	..	..	..	..	..	..	..	..	..	..	..
6 Dollar bonds	4,510	1,590	..	..	..	395	..	270	..	2,255	
7 Other bonds	865	340	..	..	..	85	..	60	..	380	
11 Stocks	1,700	105	..	215	..	105	..	35	..	1,240		
Total	18,470	2,805	1,090	5,320	460	1,155	390	555	..	6,695		
At cost	..	..	..	..	..	..	..	..	..	..	..
6 Dollar bonds	6,475	2,230	1,090	5,380	460	570	..	390	..	3,235		
Total	20,980	3,540	1,090	5,380	460	1,370	390	685	..	8,065		

Appendix Table 1 (concl.)

	TOTAL	CREDIT INSTITUTIONS Private Fed.	PUBLIC UTIL.	T Y P E O F H O L D E R							COLLECTIVES		HOUSE- HOLDS *
				MFG., TRADE, ETC.	OTHER BUSINESS			FARMS	Private nonprofit	Fed.			
					MINES	OTHER							
				1	9	3	9						
1 Total	14,100	1,802	40	934	4,248	394	743	334	352	..	5,253		
2 Foreign currency & bullion	..	..	..	..	..	..	..	..	..	..	..
3 Deposits	400	150	..	..	..	..	..	..	..	..	250
Other short term claims	..	..	..	..	..	..	..	..	..	..	..
4 On foreign governments	..	..	..	..	..	..	..	..	..	..	..
5 On other foreigners	650	..	..	..	310	..	150	..	5	..	185
Long term claims	..	..	..	..	..	..	..	..	..	..	..
6 Dollar bonds	1,685	590	..	..	..	..	150	..	100	..	845
7 Other foreign bonds	915	360	..	..	..	..	90	..	65	..	400
8 Other liabilities ^a	815	30	40	..	160	..	80	..	..	..	505
Stocks	..	..	..	..	..	..	..	..	..	..	..
9 Direct investment, subsidiaries ^a	4,760	572	..	934	3,548	394	148	334	142	..	678		
10 Direct investment, branches	1,990	..	..	..	..	..	..	..	..	..	..
11 Portfolio investments	1,700	100	..	..	205	..	100	..	35	..	1,260
Direct foreign assets	..	..	..	..	..	..	..	..	..	..	..
12 Real estate	850	..	..	..	25	..	25	..	5	..	795
13 Movable goods	335	..	..	..	..	..	..	..	..	..	335
Only item 6 can be estimated at cost, as follows:													
6 Dollar bonds	2,430	855	..	..	..	..	215	..	145	..	1,215
Total	14,845	2,067	40	934	4,248	394	808	334	397	..	5,623		

1 9 4 6

1 Total	24,840	2,174	1,480	925	5,398	535	865	355	413	6,375	6,320
2 Foreign currency & bullion	275	..	..	..	..	..	..	..	..	275	..
3 Deposits	450	175	..	..	..	..	..	..	..	..	275
Other short term claims											
4 On foreign governments	205	..	195	..	..	..	..	..	..	10	..
5 On other foreigners	775	..	..	..	410	..	150	..	..	..	215
Long term claims											
6 Dollar bonds	1,535	550	..	..	..	..	135	..	90	..	760
7 Other foreign bonds	1,395	540	..	..	..	..	145	..	100	..	610
8 Other liabilities ^b	5,650	35	1,285	..	175	..	85	..	..	3,490	580
Stocks											
9 Direct investment, subsidiaries ^c	6,050	{	..	925	4,488	535	175	355	168	..	900
10 Direct investment, branches	2,220	}	..	..	..	..	..	..	..	..	1,850
11 Portfolio investments	2,500	150	..	..	300	..	150	..	50	..	..
Direct foreign assets											
12 Real estate	2,550	..	..	..	25	..	25	..	5	1,700	795
13 Movable goods	1,235	..	..	..	..	..	..	..	..	900	335

Only items 6, 7, and 11 can be estimated in 1939 prices, and items 6, 12, and 13 at cost, as follows:

In 1939 prices

6 Dollar bonds	1,235	445	..	..	..	..	110	..	70	..	610
7 Other bonds	1,195	465	..	..	..	..	130	..	80	..	520
11 Stocks	1,890	115	..	..	250	..	110	..	35	..	1,400
Total	23,730	1,959	1,480	925	5,328	535	785	355	358	6,375	5,630
At cost											
6 Dollar bonds	1,805	645	..	..	..	..	160	..	105	..	895
12 Real estate	2,900	..	..	..	25	..	25	..	5	2,125	720
13 Movable goods	4,735	..	..	..	..	..	..	..	..	4,450	285
Total	28,960	2,269	1,480	925	5,398	535	890	355	428	10,350	6,330

^a Including estates and trusts.

^b Including trusts and estates, real estate mortgages, insurance policies.

^c Including nonprofit organizations and partnerships; including loan capital.

Appendix Table 2
Foreign Assets in the United States, Market Value, 1929, 1939, 1946
(millions of dollars)

		CREDIT INSTITUTIONS	PUBLIC	T Y P E O F D E B T O R						FARMS	Private nonprofit	COLLECTIVES	HOUSE-
	TOTAL	Private	Util.	MFG., TRADE, ETC.	MINES	OTHER BUSINESS							HOLDS *
					1	9	2	9					
1 Total	9,285	3,585	1,180	3,045	315	400			10		125		190
2 U.S. currency & bullion	"	"	"	"	"	"			"		"		"
3 Deposits	1,710	1,710	"	"	"	"			"		"		"
4 Other short term claims	1,365	1,190	"	175	"	"			"		"		"
Long term claims													
5 Bonds	575	"	405	45	"	"			"		125		190
6 Other claims *	750	875	"	115	"	70			"		"		
Stocks													
7 Direct investment, subsidiaries	1,100	}	275	700	15	90			10				"
8 Direct investment, branches	300												
9 Portfolio investments	3,000	"	450	2,010	300	240			"		"		"
Reproducible assets b													
10 Real estate	85	"	"	"	"	"			"		"		"
11 Inventory	350	"	"	"	"	"			"		"		"
Only items 5 and 9 can be estimated in 1939 prices, as follows:													
5 Bonds	530	"	365	40	"	"			"		125		"
9 Stocks	1,800	"	270	1,205	180	145			"		"		"
Total	7,990	3,585	910	2,235	195	305			10		125		190
1 Total	13,055	5,060	1,328	4,099	348	623			17		645		500
2 U.S. currency & bullion	220	"	"	"	"	"			"		220		"
3 Deposits	3,430	3,265	"	"	"	"			"		165		"

Comment

Solomon Fabricant

Current estimates of the increase in 'real' national wealth focus attention on durable movable goods and on 'improvements' of real estate. This practice ignores changes in real wealth due, for example, to certain changes in the educational level of the population, intangible assets of business concerns, and land values. I would like to throw into the discussion a question on the last, that is, the changes in real wealth reflected by certain changes in the value of land, particularly farm land.

Noteworthy elements of change in the real wealth resident in farm land include: (a) gross capital formed by clearing land and breaking prairies; (b) capital consumed by soil depletion. It is pretty clear that these represent real investment or disinvestment. In addition, there is an element that is closer to the borderline; (c) gross capital formed by a farmer 'sweating out' a period of low current income (as ordinarily measured), while the value of his land rises with the development of transport facilities, migration, and the natural increase in population. Does this act of patience on the part of settlers—their willingness to produce at low current rates of return in the expectation that land values will rise—mean real investment? That is, is it analogous in important respects to the investment in time by distillers in the business of aging whiskey or by cutters and storers of natural ice? May this type of investment in land be measured, at least in theory, by the difference between the rate of return that might normally be expected by settlers had they stayed at home and the current rate of return they might normally expect to receive on the new farms?

Of course, no account books are kept of the changes in wealth represented by (a), (b), or (c). Indeed, the significant question is not how to go about actually measuring them in any formal way, but simply whether they may be considered important enough to require serious qualification of the usual measures of net capital formation. And particularly, are qualifications of estimates of net capital formation more necessary for some

periods (e.g., the 19th century) than for others (e.g., the 20th); or for some countries than for others? Anyone seriously interested in the theory of economic development must come to grips with these questions.

E. W. Morehouse

I disagree with Mr. Kosh on the three basic conclusions reached in his 'Tangible Assets of Public Utilities'. As I understand his views, these conclusions are:

- 1) Because utilities are subject to widespread regulation, their value for 'national wealth' estimates at a given date is or should be 'regulatory value' for rate-making purposes;
- 2) Depreciation reserves or reserve requirements on a straight line basis reflect actual accrued depreciation ('capital consumption');
- 3) 'Original cost' (to original owner) minus depreciation reserves is "the most meaningful available estimate of public utility wealth".

In other words, the value of utility assets is what Mr. Kosh thinks is or should be the rate-base used by the most 'advanced' commissions.

I, on the contrary, am of the opinion that:

- 1) 'Original cost', whatever one may think of it for rate-base valuation purposes, is not predominant and is not the most feasible standard of value that should be used for estimating national wealth in utility assets at a given time.
- 2) Except by chance, straight line depreciation reserves or reserve requirements do not measure actual accrued depreciation, using 'depreciation' in the economist's sense—loss of value.
- 3) To estimate national wealth in a given year utility assets, like other forms of wealth, should be valued on the basis of the income actually earned, not on the basis of a much agitated for rate-base theory.

ORIGINAL COST

The core of my objection to Mr. Kosh's use of 'original cost' is that, in practice, it does not represent the generally accepted regulatory concept of rate-base value he asserts it to be. Even if it did, it would not by itself fairly represent either the economic or the regulatory value of the tangible assets of electric and manufactured gas utility companies.

Careful check will show, I believe, that very few state commissions, in actual practice, give exclusive or even predominant weight to 'original cost' in their rate-base findings. Such state commissions as do consistently use this basis have jurisdiction over only a small minority of the assets of the industry. Mr. Kosh seems to have interpreted a change in accounting principle and the agitation for 'original cost' as a rate-base by the Federal Power Commission and a few state commission representatives as a basic shift in regulatory principle. Many state commissions still do not accept this thinking, whether from conviction, because of the governing statutes and court decisions under which they operate, or for other reasons. In the rate-base they adopt, they give weight to various adjustments of 'original cost'—a cost of reproduction estimate, a statement of investment by the present owner, or some adjustment to current price levels by indexing 'original costs', or other allowances. Mr. Kosh recognizes the possibility of using indexes of original cost but it is not very clear how much, if any, weight he would give such indexed costs; I gathered he would not give them any material weight.

Even commissions that may give predominant weight to 'original cost' in a rate-base will not use the same rates of returns. After all, rate-bases and rates of return, indeed the whole concept of rate-making value itself, are merely tools for the regulatory bodies to use in reaching their prime objective: to determine prices that will allow a utility company to earn no more than reasonable earnings. Mr. Kosh seems to recognize this in the early part of his paper but loses sight of it when he attaches such importance to rate-bases as evidences of value.

It must be remembered that the regulatory concept of value for rate-making purposes is operative only at intervals and as a limit as of a given time. Such value represents a ceiling that limits earnings, with some lag in application because it is based on the past although it is presumed to operate in the future. There is no guarantee of earnings. In his text, Mr. Kosh recognizes the problem of valuing tangible assets of utilities operating in a dwindling market, but it is not clear how he carried this thinking into his estimates.

In objecting to the use of 'original cost' (which on examination will be found to be a Joseph's coat of many colors) as the measuring stick for electric and manufactured gas utility assets, I do not thereby subscribe to 'cost of reproduction' as the yardstick. I would agree that some indexing of 'original cost' is necessary to reflect the generally prevailing regulatory concept of value upon which Mr. Kosh lays such stress. But such indexing is very difficult statistically in view of the unknown but varying dates of installation of plant at 'original costs'. It does not appeal to me as a feasible method of adjustment in a valuation embracing such a large aggregate of assets, whatever its merits in valuing the property of an individual company.

DEPRECIATION

My essential objection to Mr. Kosh's use of straight line depreciation reserve or reserve requirement in his value estimate is that it confuses accounting and value concepts. Accrued depreciation for the purpose of estimating national wealth should be, I assume, 'loss of value'. Experts on depreciation and valuation will generally agree, I think, that only by chance would a straight line depreciation reserve or reserve requirement represent actual depreciation, in the sense of loss of value, at a given date. Straight line depreciation is an accounting convention whereby costs are amortized over more than one accounting period. The reserve at a given date shows only the net amount set aside to amortize plant costs. It is a matter of accounting convenience and practicality, but it does not, except by chance, reflect actual loss of value in a single account-

ing year or succession of them. Such a reserve is only accrued amortization.

A direct estimate of accrued depreciation of utility property on a comprehensive and comparable basis with other kinds of property is indeed beset with difficulties. It really requires a study of each company's property, which is clearly impracticable in a valuation as large and comprehensive as this. Also the comparability and significance of depreciation reservations in price-regulated and unregulated industries are open to debate. It is questionable whether the same significance should be attached to the depreciation reserves in the two types of industry. I know of no easy way to reconcile these differences or difficulties and therefore think it would be preferable to try other methods of valuation.

CAPITALIZATION OF INCOME

It seems more justifiable, under all the circumstances, to base the value estimate of tangible utility property upon a capitalization of income method.

The problem, as I see it, is not to determine a value for the purpose of determining prices (a theme running through Mr. Kosh's paper); the problem is to estimate national wealth in terms of utility assets. I submit that such a valuation can best be founded on the income received from those assets, whether that income be called reasonable or unreasonable, excessive or confiscatory, just or unjust, legitimate or illegitimate, or merely 'windfall'.

As Mr. Kosh himself comments, the statements of income of public utilities are probably more reliable than balance sheet figures. The reported income is at least the result of the application, faulty and imperfect as it may be, of regulatory concepts of value and income. Though regulation is imperfect and some of the income reported may be in excess of what might be deemed reasonable after a full rate case investigation, the income was received and therefore becomes a subject of valuation. I think the estimate of value should not be based upon the estimator's view of what would be the results if our regu-

latory institutions operated more satisfactorily according to his views. It seems more realistic to take the results as we find them.

Mr. Kosh rejects the capitalization of income method, in part at least, because he thinks it involves circular reasoning as applied to public utilities. He would be on solid ground if that method were being used to fix prices and control earnings. That is not the present purpose. The reported income already reflects whatever price-fixing and earnings limitations have been imposed by regulatory authorities. Hence it already reflects the avoidance of circular reasoning to whatever extent regulatory action does so. The present task, as I understand it, is to estimate or 'discover' the value of that income in the years chosen for study, on a basis that is reasonably comparable with the valuations of incomes from other types of asset or industry. Capitalization of income is a conventional method of such valuation which should yield comparable results when the incomes are stated on a consistent basis and the capitalization rates are appropriate, comparing the risks and probabilities of one industry with another. Use of this method does not involve circular reasoning, in my opinion, unless the resultant value is used to fix prices and control earnings, neither purpose being part of this project. Parenthetically it may be noted that public utility securities compete with the securities of other industries for the investor's dollar; this seems another reason for using a common method of valuation.

To develop an appropriate capitalization rate to apply to an aggregate of utility income seems better and more feasible than to essay the difficulties of determining original cost, accrued depreciation, and related elements of value by direct appraisal of the assets. A considerable portion of the common stocks issued by electric power and manufactured gas companies are owned by holding companies, it is true, and these shares do not have any direct market value. This was particularly true in 1929 and 1939; it was less true in 1946 because of the divestment of holding company assets pursuant to the integration program prescribed by the SEC under the Public Utility Hold-

ing Company Act. Even so, there is probably a sufficient sample of publicly held public utility common stocks, as there certainly is a sufficient sample of bonds and preferred stocks of public utilities, to afford a basis for a statistical investigation of appropriate capitalization rates. Adjustments would have to be made for certain capital costs that may not be adequately reflected by such a statistically determined capitalization rate and for the probabilities of regulatory actions affecting earnings or dividends. Such a capitalization rate once determined, however, can be readily compared with the capitalization rates appropriate for incomes derived from other types of assets and other industries, and in this way serve as a check on comparability.

The main issue between Mr. Kosh and myself, as I view it, is simply this. I believe valuation for national wealth estimates is a matter of informed judgment concerning the incomes received. Mr. Kosh would value utility assets on the basis of a rate-making value theory which he thinks is or should be increasingly used by commissions in fixing utility rates. In my opinion, utility assets in a national wealth estimate should be valued on the basis of the income they actually produce in the valuation year, regardless of the goodness or the badness of the rate-making theories of commissions. The income I would capitalize is not an expected or synthetic or 'reasonable' income or series of incomes; it is the actual income reported in the year of valuation, in this case, 1946.

Mr. Kosh's valuation theories lead to some curious results. He values the tangible assets of Class I railroads in 1946 at \$19.8 billion and privately owned electric utilities at \$11.6 billion. The latter figure happens to coincide with the net book cost of plant of Class A and B electric utilities (including some gas and other utility plant, however) as summarized by the Federal Power Commission for 1946. The same FPC summary reports operating income of \$830 million from these assets in 1946. Mr. Kosh notes that "fair rates of return" have decreased to 5-5.5 percent. These rates of return, applied to \$11.6 billion, yield \$580-638 million. Is the balance, \$250-192 million, a

'windfall' due to imperfect regulation or 'regulatory lag' or 'unjust enrichment' soon to be wiped out, which should be ignored in valuing utility assets? I think such income should not be ignored. Incidentally, railway operating income in 1946 was reported to be \$619 million, about 3.1 percent of Kosh's 'value', \$19.8 million. The relationships between these figures for the two industries make one wonder whether the value estimates are on a realistically comparable basis.

GENERAL COMMENTS

Of necessity, this comprehensive valuation project relies heavily on accounting statements. A caution needs to be uttered lest the eagerness to find some data lead to an uncritical use of accounting statements as though each were of equal worth and met identical standards. Although accounting principles and statements were greatly improved between 1929 and 1946, they are only man-made conventions. Careful scrutiny will show, I think, that accounting statements vary from company to company, from industry to industry, and from year to year. The comparability of statements of income needs to be watched. For example, the statements of income usually issued by privately and publicly owned utilities differ, sometimes materially, so that what is called net income in one case may not be fully comparable with net income in another. Similar and sometimes wider variations are found in balance sheet statements.

Reply by Mr. Kosh

The criticism Mr. Morehouse levies at my paper arises in large part from my poor exposition. For that I can do no more than apologize, and attempt to rephrase my thoughts.

But first, I wish to make clear one general misconception that seems to be a recurring theme in the criticism. For example, my thesis is said to be: "the value of utility assets is what Mr. Kosh thinks is or should be the rate-base used by the most advanced commissions".

I wish to state emphatically that for purposes of this paper I have neither expressed nor implied what I think should be a

proper method of determining regulatory value or rate-base, nor have I tried or desired to characterize commissions as "advanced" or retarded. The paper is an attempt to reflect what commissions do, not what they should do.

As Mr. Morehouse so clearly points out, the main issue between us is that he believes "utility assets in a national wealth estimate should be valued on the basis of the income they actually produce in the valuation year", whereas I think that the value of utility assets for national wealth purposes tends to approach regulatory value.

Now, were Mr. Morehouse to insist that capitalization of income is a preferable or the only appropriate measure, an answer would be considerably more difficult. In any event I feel I have met that contention in my paper. But his claim is entirely different: he would capitalize "the income they actually produce in the valuation year", "not an expected or synthetic or 'reasonable' income or series of incomes".

Capitalization of income is a general and perfectly valid theory of valuation, but it is always capitalization of expected incomes, never past incomes. Capitalization of past or a given year's actual income does not, in principle, yield an estimate of value. One never buys an economic good because of the income it did in fact yield to its past owner; one buys it for the expected income. I can do no better than quote Mr. Kuznets again:

"If the theoretically defined value of wealth items is to be attained directly by a valuation procedure, the services yielded by the wealth item may be assumed to be represented by the net income it produces. On this assumption, the current value of any wealth item is determined by three variables: (1) the magnitude of future income streams; (2) the temporal distribution of these expected incomes in the future; (3) the rate of interest to be used for discounting. Lack of knowledge about any of the three variables makes it impossible to apply this method of valuation satisfactorily. And a brief consideration of each of the three variables will show that, by their very nature, *direct* information on them is not likely to be available for any but minor groups of wealth items.

The determination of the first variable requires data on incomes

expected from the various items of wealth, the latter classified into the various categories it is important to distinguish. Since the requirement is for *expected* incomes, the relevant information is in the nature of a forecast rather than of a record of past or present economic events; and it is this characteristic that makes the information necessarily conjectural." ('On the Measurement of National Wealth', pp. 20-1)

Mr. Morehouse's insistence on the capitalization of actual income in the valuation year puzzles me for another reason. Utility operating income for Class A and B electric utilities, as reported by the Federal Power Commission, was \$833 million in 1945, \$829 million in 1946, and \$815 million in 1947. Mr. Morehouse would not, I am sure, suggest that the value of the assets of the electric utility business declined between 1945 and 1947; in fact I rather suspect he would agree it increased. But if a steadily *decreasing* income is to be capitalized to obtain a steadily *increasing* value, the capitalization rate must have been decreasing even faster than income. Would Mr. Morehouse agree that the uncertainty of investing in the electric utility business has been *decreasing* since 1945, as would be intimated by a decreasing capitalization rate; and that, by the same token, the fair rate of return too should have been progressively reduced?

As concerns Mr. Morehouse's contention that original or book cost is not the predominant method of determining the rate-base, I can do no more than refer to cases currently being decided and to the brief statistical analysis described in my paper.

One more point—depreciation. I did not claim that a straight line depreciation reserve is equivalent to total accrued depreciation in the economic sense. What I did say was that such reserves are widely used by regulatory bodies as a measure of accrued depreciation in determining regulatory value. Since I believe utility value for national wealth estimating purposes approaches regulatory value, these book reserves are pertinent in estimating the value of utility assets for national wealth purposes.

And at the risk of becoming boring, I repeat that it does not follow from the above that I subscribe to book cost minus depreciation reserve as a proper method of ascertaining utility regulatory value.

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